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Ontario. Legislative Assembly

SESSIONAL PAPERS.

Volume XXXVIII. Part V.

Second Session of Eleventh Legislature

OF THE

PROVINCE OF ONTARIO.

SESSION 1906.

8/12/12
15/12/pc

TORONTO:
PRINTED AND PUBLISHED BY L. K. CAMERON
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
1906

LIST OF SESSIONAL PAPERS.

ARRANGED ALPHABETICALLY.

TITLE.	NO.	REMARKS.
Accounts, Public	1	*Printed.*
Agricultural College, Report	14	“
Agricultural and Experimental Union, Report	15	“
Archives, Report	41	“
Asylums, Report	38	“
Asylums, Perquisites of Officials	58	*Printed for distribution to Members only.*
Ballot Papers, fac similes	63	*Not printed.*
Bee-Keepers' Association, Report	20	*Printed.*
Births, Deaths and Marriages, Report	9	“
Brockville License Commissioners, Correspondence	6	*Not printed.*
Canadian Improvement Company, Agreement	80	*Printed.*
Central Prison, Rope and Cord Contract	65	“
“ Woodware Contract	73	“
Children, Neglected, Report	43	“
Colonial Investment Company, Assets	78	*Not printed.*
Colonization, Report	32	*Printed.*
Crown Lands, Report	3	“
“ Sales since 1867	54	*Not printed.*
Dairymen's Association, Report	22	*Printed.*
Division Courts, Report	33	“
Education, Report of Minister	12	*Printed.*
“ Orders in Council	51	*Not printed.*
“ Teachers' Certificates	67	“
“ Books on authorized list	76	“
Elections, Return from Records	46	*Printed.*
Electric Power Commission, Report	49	“
Entomological Society, Report	19	“
Equitable Loan Company	78	*Not printed.*
Estimates	2	*Printed.*
Factories, Report	8	*Printed.*
Fairs and Exhibitions, Report	26	“
Farmers' Institutes, Report	25	“
Fisheries, Report	31	“
“ Thames River	70	*Not printed.*
Fruit, Report	24	*Printed.*

Title.	No.	Remarks.
Fruit, Growers' Association, Report	16	*Printed.*
" Experiment Stations, Report	17	"
Fumigation Appliances, Report	18	"
Game Commission, Report	30	*Printed.*
Gaols, Prisons, and Reformatories, Report	39	"
Government Bond Issue, Correspondence	68	"
Health, Report	36	*Printed.*
Highways, Report	27	"
Home Guard, Fenian Raid, Certificates	64	*Not printed.*
Hospitals and Charities, Report	40	*Printed.*
Hydro-Electric Power Commission, Report	49	"
Indian Claim, Treaty No. 9	71	*Not printed.*
Industries, Report	28	*Printed.*
Insurance, Report	10	"
King's College, Endowment of Grants to, etc	53	*Not printed.*
Labour, Report	29	*Printed.*
Lands, Forests and Mines, Report	3	"
Land Titles, Report	75	*Not printed.*
Legal Offices, Report	34	*Printed.*
Library, Report	47	*Not printed.*
License Commissioners and Inspectors, Correspondence	52	"
License Commissioners, Brockville, Correspondence	69	"
" " North Renfrew, Correspondence	74	"
Liquor Licenses, Report	44	*Printed.*
Live Stock Associations, Report	23	"
Loan Corporations, Statements	11	"
McClure, Herchel, etc., withdrawal of lots in	55	*Not printed.*
Market Fees, amount received etc	62	"
Marriage Licenses, Issuers of, etc	59	"
Mines, Report	5	*Printed.*
Mining Divisions, O. in C	66	*Printed for distribution only.*
Municipal Auditor, Report	45	*Printed.*
Murphy, J., Correspondence, Timber Berth	72	*Not printed.*
Panton, A. M., Correspondence *re* Scully *vs.* Peters	61	*Not printed.*
Petewawa, Liquor License, Correspondence	74	"
Pigeon River, Timber Berth, Block D	72	"
Poultry Institute, Report	21	*Printed.*
Prisons and Reformatories, Report	39	"
Provincial Municipal Auditor, Report	45	"
Public Accounts, 1905	1	"

TITLE.	NO.	REMARKS.
Public Institutions, Perquisites to Officials of	58	*Printed for distribution to Members only.*
Public Works, Report	7	*Printed.*
Queen Victoria Niagara Falls Park, Report	6	*Printed.*
Registrar-General, Report	9	*Printed.*
Registry Offices, Report	35	"
Rope and Cord Contract, Central Prison	65	"
School of Practical Science, Calendar, 1906-7	60	*Printed for distribution only.*
St. Thomas, Audit, Correspondence	79	*Not printed.*
Scully *versus* Peters, Correspondence	61	"
Secretary and Registrar, Report	37	*Printed.*
Statutes, Distribution of	77	*Not printed.*
Succession Duties, Orders in Council *re* Regulations	50	"
Surrogate Court Act, Fees under	56, 57	"
Temiskaming and N.O. Railway, Report	48	*Printed.*
Thames River Fisheries, Licenses Granted	70	*Not printed.*
Timber Berth, Block D, Pigeon River, Correspondence	72	"
Toronto University, Report	13	*Printed.*
Toronto University Commission, Report	42	"
Toronto University Endowments, Grants, etc., to	53	*Not printed.*
Treasury Bills, six months, $6,000,000	68	*Printed.*
Vegetable Grower's Association, Report	4	*Printed.*
Woodenware Contract, Central Prison	73	*Printed.*

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Arranged in Numerical Order with their Titles at full length; the dates when Ordered and when presented to the Legislature; the name of the Member who moved the same, and whether Ordered to be Printed or not.

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No. 1. Public Accounts of the Province for the year 1905. Presented to the Legislature, February 27th, 1906. *Printed.*

No. 2. Estimates for the service of the Province until the Estimates of the year are finally passed. Presented to the Legislature 22nd February, 1906. *Not Printed.* Estimates for the year 1906. Presented to the Legislature 5th March, 1906. *Printed.* Estimates (Supplementary) for the year 1906. Presented to the Legislature, 9th May, 1906. *Printed.*

No. 3. Report of the Minister of Lands, Forests and Mines for the year 1905. Presented to the Legislature 11th April, 1906. *Printed.*

No. 4. Report of the Vegetable Growers' Association for the year 1905. Presented to the Legislature, 7th May, 1906. *Printed.*

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No. 5. Report of the Bureau of Mines for the year 1905. Presented to the Legislature, 24th April, 1906. *Printed.*

No. 6. Report of the Commissioners of the Queen Victoria Niagara Falls Park, for the year 1905. Presented to the Legislature, 27th February, 1906. *Printed.*

No. 7. Report of the Minister of Public Works for the year 1905. Presented to the Legislature, 4th April, 1906. *Printed.*

No. 8. Report of the Inspectors of Factories for the year 1905. Presented to the Legislature, 7th May, 1906. *Printed.*

No. 9. Report relating to the Registration of Births, Marriages and Deaths for the year 1904. Presented to the Legislature, 20th February, 1906. *Printed.*

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No. 10. Report of the Inspector of Insurance for the year 1905. Presented to the Legislature, 19th March, 1906. *Printed.*

No. 11. Loan Corporations, Statements by Building Societies, Loan and other Companies, for the year 1905. Presented to the Legislature, 19th March, 1906. *Printed.*

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No. 12. Report of the Minister of Education, for the year 1905, with the Statistics of 1904. Presented to the Legislature, 20th February, 1906. *Printed.*

No. 13. Auditors' Report to the Board of Trustees, University of Toronto, on Capital and Income Accounts, for the year ending 30th June, 1905. Presented to the Legislature, 17th February, 1906. *Printed.*

No. 14. Report of the Ontario Agricultural College and Experimental Farm, for the year 1905. Presented to the Legislature, 21st February, 1906. *Printed.*

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No. 15. Report of the Ontario Agricultural and Experimental Union of the Province, for the year 1905. Presented to the Legislature, 8th March, 1906. *Printed.*

No. 16. Report of the Fruit Growers' Association of the Province, for the year 1905. Presented to the Legislature, 21st February, 1906. *Printed.*

No. 17. Report of the Fruit Experimental Stations of the Province, for the year 1905. Presented to the Legislature, 14th March, 1906. *Printed.*

No. 18. Report of the Inspector of Fumigation Appliances of the Province, for the year 1905. Presented to the Legislature, 7th May, 1906. *Printed.*

No. 19. Report of the Entomological Society, for the year 1905. Presented to the Legislature, 21st February, 1906. *Printed.*

No. 20. Report of the Bee-Keepers' Association of the Province, for the year 1905. Presented to the Legislature, 7th May, 1906. *Printed.*

No. 21. Report of the Poultry Institute of the Province, for the year 1905. Presented to the Legislature, 7th May, 1906. *Printed.*

No. 22. Reports of the Dairymen's Associations of the Province, for the year 1905. Presented to the Legislature, 7th May, 1906. *Printed.*

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No. 23. Reports of the Live Stock Associations of the Province, for the year 1905. Presented to the Legislature, 7th May, 1906. *Printed.*

No. 24. Report on the Fruits of the Province, for the year 1905. Presented to the Legislature, 7th May, 1906. *Printed.*

No. 25. Report of the Farmers' Institutes of the Province, for the year 1905. Presented to the Legislature, 11th April, 1906. *Printed.*

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No. 26. Report of Ontario Fairs and Exhibitions of the Province, for the year 1905. Presented to the Legislature, 28th February. 1906. *Printed.*

No. 27. Report of the Commissioner of Highways, for the year 1905. Presented to the Legislature, 10th April, 1906. *Printed.*

No. 28. Report of the Bureau of Industries of the Province, for the year 1905. Presented to the Legislature, 7th May, 1906. *Printed.*

No. 29. Report of the Bureau of Labour, for the year 1905. Presented to the Legislature, 24th April, 1906. *Printed.*

No. 30. Report of the Ontario Game Commission, for the year 1905. Presented to the Legislature, 22nd March, 1906. *Printed.*

No. 31. Report of the Department of Fisheries, for the year 1905. Presented to the Legislature, 28th March, 1906.

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No. 32. Report on Colonization, for the year 1905. Presented to the Legislature, 9th May, 1906. *Printed.*

No. 33. Report of the Inspector of Division Courts, for the year 1905. Presented to the Legislature, 9th March, 1906. *Printed.*

No. 34. Report of the Inspector of Legal Offices, for the year 1905. Presented to the Legislature, 14th March, 1906. *Printed.*

No. 35. Report of the Inspector of Registry Offices, for the year 1905. Presented to the Legislature, 7th May, 1906. *Printed.*

No. 36. Report of the Provincial Board of Health, for the year 1905. Presented to the Legislature, 21st February, 1906. *Printed.*

No. 37. Report of the Secretary and Registrar of the Province, for the year 1905. Presented to the Legislature, 7th May, 1906. *Printed.*

No. 38. Report upon the Lunatic and Idiot Asylums of the Province, for the year ending 30th September, 1905. Presented to the Legislature, 21st February, 1906. *Printed.*

No. 39. Report upon the Prisons and Reformatories of the Province, for the year ending 30th September, 1905. Presented to the Legislature, 21st February, 1906. *Printed.*

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No. 40. Report upon the Hospitals and Charities of the Province, for the year ending 30th September, 1905. Presented to the Legislature, 21st February, 1906. *Printed.*

No. 41. Report upon the Archives of the Province, for the year 1905. Presented to the Legislature, 30th April, 1906. *Printed.*

No. 42. Report of the Royal Commission on the University of Toronto. Presented to the Legislature, 6th April, 1906. *Printed.*

No. 43. Report of Work relating to Neglected and Dependent Children of Ontario, for the year 1905. Presented to the Legislature, 20th April, 1906. *Printed.*

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No. 44. Report upon the Inspection of Liquor Licenses, for the year 1905. Presented to the Legislature, 20th February, 1906. *Printed.*

No. 45. Report of the Provincial Municipal Auditor, for the year 1905. Presented to the Legislature, 7th May, 1906. *Printed.*

No. 46. Supplementary Return from the Record of the several Elections in the Electoral Divisions of East Nipissing, Kingston and North Toronto, since the General Elections on January 25th, 1905, shewing: (1) The number of Votes Polled for each Candidate in the Electoral District in which there was a contest; (2) The majority whereby each successful Candidate was returned; (3) The total number of votes polled in each District; (4) The number of votes remaining unpolled; (5) The number of names on the Voters' Lists in each District; (6) The population of each District as shewn by the last Census. Presented to the Legislature, 2nd April, 1906. Printed.

No. 47. Report upon the state of the Library. Presented to the Legislature, 22nd March, 1906. *Not printed.*

No. 48. Report of the Temiskaming and Northern Ontario Railway Commission, for the year 1905. Presented to the Legislature, 1st March, 1906. *Printed.*

No. 49. Report of the Hydro-Electric Power Commission of the Province. Presented to the Legislature, 11th April, 1906. *Printed.*

No. 50. Copy of Order in Council approving of certain Regulations under Section 22 of the Succession Duties Act. Presented to the Legislature, 19th February, 1906. *Not printed.*

No. 51. Copies of Orders in Council under the provision of Section 9, Chapter 38, 1 Edward VII., *re* Education. Presented to the Legislature, 20th February, 1906. *Not printed.*

No. 52. Return, in part, to an Order of the House of the eleventh day of May, 1905, for a Return of, 1. Copies of all correspondence, documents, memoranda, instructions and circulars in connection with the appointment of license commissioners and inspectors for the present year, or in connection with their administration of their offices. 2. The names of all license inspectors who were dismissed, or have resigned during the present year and the reasons for their dismissals, or resignations, with the names of those appointed in their places. Presented to the Legislature, 20th February, 1906. Mr. *McDougal. Not printed.*

No. 53. Return to an Order of the House of the second day of May, 1905, for a Return shewing:—1. The original endowment or grants to King's College, Toronto, in (*a*) Lands. (*b*) Money. 2. The amount derived from sale of land by King's College, or University College, Toronto, and statement of lands still owned by University College. 3. Statement shewing subsequent Legislative endowments, or grants, to University College or Toronto University in lands, or money. 4. (*a*) The property or funds at present held by, or in trust, for the University of Toronto, or University College, or any of the affiliated Colleges. (*b*) The present annual revenue from such property or funds. 5. Statement of expenditures, annually, on buildings and equipment, salaries and maintenance of Toronto University or University College for the last ten years. 6. The annual amount at present required for salaries and expenses of maintenance. 7. Statement of all legislative grants, or expenditures, for University purposes at any city in Ontario, other than Toronto. Presented to the Legislature, 20th Februray, 1906. Mr. *Calder. Not printed.*

No. 54. Return to an Order of the House of the third day of May, 1905, for a Return shewing, by Counties, the amounts due the Province on acount of unpaid balances, due on sales of Crown Lands, from Confederation down to December 31st, 1904. Presented to the Legislature, 20th February, 1906. Mr. *Smith (Sault Ste. Marie.) Not printed.*

No. 55. Return to an Address to His Honour the Lieutenant-Governor, of the eighteenth day of May, 1905, praying that he will cause to be laid before the House a Return of copies of all Orders-in-Council, documents, correspondence and memoranda regarding the withdrawal of lots in the townships of McClure, Herchel, Dungannon, Mount Eagle, Mayo, Limerick, Cardiff, Farraday and Chandos, from sale or location, or other disposition, for a period of twenty-five years. Presented to the Legislature, 28th February, 1906. Mr. *Smyth. Not printed.*

No. 56. Copies of Orders-in-Council under ss. 2 of section 84 of the Surrogate Courts Act. Presented to the Legislature, 2nd March, 1906. *Not printed.*

No. 57. Copy of Order-in-Council authorizing the payment of surplus Surrogate fees to His Honour Judge Jamieson, Junior Judge of Wellington. Presented to the Legislature, 6th March, 1906. *Not printed.*

No. 58. Return to an Order of the House of the first day of March, 1906, for a Return shewing, 1. The names of all officers, attendants, or other officials of the Asylums, Prisons and other Public Institutions of the Province, under the Department of the Provincial Secretary, receiving perquisites, allowances or payments of any nature whatever, whether in cash, goods or supplies, beyond the amount voted for their salaries in the Estimates. 2. The nature and amount of such perquisites, allowances or payments received by such officer or other official. Presented to the Legislature, 6th March, 1906. Mr. *Dunlop. Printed for distribution to Members only.*

No. 59. Return to an order of the House of the twenty-seventh day of February, 1906, for a Return shewing—1. How many persons, in Ontario, were commissioned to issue Marriage Licenses on the 7th day of February, 1905. 2. How many of such persons have had their authority revoked since such date. 3. How many persons have been commissioned to issue Marriage Licenses, in Ontario, between the 7th day of February, 1905, and the 7th day of February, 1906. Presented to the Legislature, 7th March, 1906. Mr. *Ross. Not printed.*

No. 60. Calendar of the Ontario School of Practical Science for the year 1906-7. Presented to the Legislature, 16th March, 1906. *Printed for distribution only.*

No. 61. Return to an Order of the House of the fourteenth day of March, 1906, for a Return of Copies of all correspondence, papers and documents between the Attorney-General, or other Member of the Government, and A. M. Panton and others, in the year 1903, in any way relating to the action at law brought by Mr. Scully, against Mr. Peters for malicious prosecution. Presented to the Legislature, 20th March, 1906. Mr. *Torrance. Not printed.*

No. 62. Return to an Order of the House of the eleventh day of May, 1905, for a Return shewing the amount received in each of the last five years for Market Fees in Cities and Towns situated in Counties in which Toll Roads exist, or have existed during the past five years. And shewing as well what reductions, if any have been made in the respective market fees by Towns and Cities situated in Counties in which Toll Roads have been abolished during the past five years. Presented to the Legislature, 22nd March, 1906. Mr. *Thompson* (*Wentworth.*) *Not printed.*

No. 63. Return to an Order of the House of the twenty-first day of March, 1906; That the Clerk of the House, *ex-officio*, Clerk of the Crown in Chancery, do lay upon the Table of the House, facsimiles of the Ballot papers furnished to the Returning Officers and Deputy Returning Officers, and used in the recent Bye Elections in the City of Kingston and in the North Riding of the City of Toronto. Presented to the Legislature, 23rd March, 1906. Mr. *Pense*. *Not printed.*

No. 64. Return to an Address to His Honour the Lieutenant-Governor of the sixteenth day of March, 1906, praying that he will cause to be laid before the House a Return of copies of all correspondence with the Government, or any member thereof, together with a copy of any Orders in Council, in the matter of granting Certificates to the Home Guard acting during the Fenian Raid in the year 1866. Presented to the Legislature, 27th March, 1906. Mr. *Smyth*. *Not printed.*

No. 65. Copy of an Agreement between the Province and William Bernard Converse, of Montreal, conditioned for the manufacture of rope and cord at the Central Prison. Presented to the Legislature, 11th April, 1906. *Printed.*

No. 66. Copies of Orders in Council under the provisions of R.S.O., 1897, Chapter 36, Section 8, *in re* Mining Divisions. Presented to the Legislature, 28th March, 1906. *Printed for distribution only.*

No. 67. Return to an Order of the House of the sixteenth day of March, 1906, for a Return shewing the number of:—1. Part II. Junior Leaving and Junior Teacher's Certificates. 2. Part I. Senior Leaving and Part I. Senior Teacher's Certificates, and 3. Part II. Senior Leaving and Part II. Senior Teacher's Certificates, obtained at each of the following centres, at the examinations of 190-'01-'02-'03-'04 and '05, *viz.*—Barrie, Belleville, Berlin, Brantford, Chatham, Cobourg, Collingwood, Galt, Guelph, Hamilton, Kingston, Lindsay, London, Morrisbug, Ottawa, Owen Sound, Perth, Peterborough, Renfrew, Sarnia, Stratford, Toronto (Harbord Street), Toronto (Jamieson Avenue), Toronto (Jarvis Street), Harriston, Mea--ford, Mount Forest, Orangeville and Port Hope. Presented to the Legislature, 28th March, 1906. Mr. *MacKay*. *Not printed.*

No. 68. Copies of correspondence in the matter of the sale of $6,000,000 six months' Treasury Bills, at a rate of discount not exceeding four *per cent*,. and to the subsequent issue of Government Bonds or Stock. Presented to the Legislature, 29th March, 1906. *Printed.*

No. 69. Return to an Order of the House of the twenty-third day of March, 1906, for a Return of copies of all correspondence between the Chairman of the Board of License Commissioners of the Town of Brockville; the License Inspector, or any citizen of the Town and the Government, or any Member thereof, or the

License Department, with reference to the enforcement or non-enforcement of the Liquor License Act, or to the granting, or withholding, of Licenses to the Imperial Hotel, or to Samuel Johnston. Presented to the Legislature, 3rd April, 1906. Mr. *Graham*. *Not printed.*

No. 70. Return to an Order of the House of the twenty-third day of March, 1906, for a Return shewing the number of fishing licenses granted on the River Thames, east of the City of Chatham, during the years 1904, 1905 and 1906; the Revenue received each year, and whether the fish were sold in Canada or the United States, and whether the fish were taken with nets, and if so, of what description. Presented to the Legislature, 3rd April, 1906. Mr. *Ross*. *Not printed.*

No. 71. Return to an Address of His Honour the Lieutenant-Governor, of the ninth day of March, 1906, praying that he will cause to be laid before the House a Return of copies of all papers and correspondence regarding the settlement of the Indian claim of Northern Ontario, known as Treaty No. 9, together with a copy of the Treaty as finally agreed upon. Presented to the Legislature, 6th April, 1906. Mr. *Ross*. *Not printed.*

No. 72. Return to an Address to His Honour the Lieutenant-Governor, of the twenty-third day of March, 1906, praying that he will cause to be laid before the House copies of all Orders in Council, papers and correspondence in any way relating to the cancellation of the license of timber berth, Block D., Pigeon River, held by J. Murphy, which stands in the Public Accounts, 1905, page 319, as a charge of $18,787.10. Presented to the Legislature, 10th March, 1906. Mr. *McDougal*. *Not printed.*

No. 73. Copy of an Agreement between the Province and Ellen Charlotte Scott, of Toronto, trading under the name of Taylor, Scott & Co'y, respecting the manufacture of wooden ware at the Central Prison. Presented to the Legislature, 18th April, 1906. *Printed.*

No. 74. Return to an Order of the House, of the sixth day of April instant, for a Return of copies of all correspondence between the License Inspector of North Renfrew, or any member of the Board of License Commissioners, or af any citizen of Pembroke, and the License Department, or any Member of the Government, with reference to the granting of a liquor license at Petewawa. Presented to the Legislature, 12th April, 1906. Mr. *Graham*. *Not printed.*

No. 75. Report of the Land Titles Office for the years 1903, 1904 and 1905. Presented to the Legislature, 27th April, 1906. *Not printed.*

No. 76. Return to an Order of the House of the fourth day of April, 1906, for a Return giving a complete list of all books on the authorized list for public and high schools, with dates of authorization; names of authors; positions occupied by them; with the Royalties, or other considerations, paid to them, respecting such books and the selling price thereof, and how prices are arranged. Presented to the Legislature, 1st May, 1906. Mr. *Craig. Printed.*

No. 77. Statement of distribution of Revised and Sessional Statutes, from 31st December, 1904, to 31st December, 1905. Presented to the Legislature, 1st May, 1906, *Not printed.*

No. 78. Return to an Order of the House of the twenty-third day of April, 1906, for a Return shewing: 1. On what terms the assets of the Equitable Loan Company were taken over by the Colonial Investment and Loan Company and what percentage was paid in stock of Colonial Company to holders of terminating stock in Equitable Loan Company. 2. The names and addresses of Directors and officials of the Colonial Investment and Loan Company. 3. The names and addresses of the Directors and officials of Imperial Trusts Company. Presented to the Legislature, 7th May, 1906. Mr. *Jamieson. Not printed.*

No. 79. Return to an Order of the House, of the first day of May, 1906, for a Return of copies of all correspondence between the Municipal Council of the City of St. Thomas, or any official thereof and any other person or persons, proposing to the Government, or any official thereof, to have a special audit of the books of the Municipality of St. Thomas. Presented to the Legislature, 7th May, 1906, Mr. *Macdiarmid. Not printed.*

No. 80. Copy of Agreement, Deed of Trust and Guaranty, made by and between His Majesty the King and the Canadian Improvement Company and others. Presented to the Legislature, 9th May, 1906. *Printed.*

Twenty-seventh Annual Report

of the

Ontario Agricultural and Experimental Union

1905

(*PUBLISHED BY THE ONTARIO DEPARTMENT OF AGRICULTURE, TORONTO.*)

PRINTED BY ORDER OF
THE LEGISLATIVE ASSEMBLY OF ONTARIO

PRINTED BY L. K. CAMERON,
Printer to the King's Most Excellent Majesty,
TORONTO, 1906

WARWICK BRO'S & RUTTER, Limited, Printers
TORONTO.

To the Honorable William Mortimer, Clark, K.C.,
Lieutenant-Governor of the Province of Ontario.

May it please your Honour:

I have the pleasure to present herewith for the consideration of your Honour the Report of the Agricultural and Experimental Union for 1905.

Respectfully submitted,

NELSON MONTEITH,
Minister of Agriculture.

Toronto, 1906.

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MEMBERS FOR 1905-1906.

The following list of members includes all of those who are or have been connected with the Agricultural College and have paid the annual membership fee for the present year. It is quite distinct from the list of co-operative experimenters, of whom there are now over 4,000.

Albright, W. D., London.
Alexander, F. J., Billings Bridge.
Allan, F. W., Churchill.
Allen, R. J., Guelph.
Angle, P. E., Fork's Road.
Arkell, H. S., Guelph.
Arkell, T. R., Arkell.
Austin, H. S., Lynn Valley.
Baird, Geo., Birnam.
Baker, J., Solina.
Baker, M. R., Guelph.
Baker, W., Walkerton.
Ballantine, P. M., Tavistock.
Ballantyne, N. M., Stratford.
Ballantyne, W. W., Stratford.
Barberree, G. L., Corwhin.
Barlow, B., Guelph.
Barnes, H. C., Guelph.
Barnet, W. A., Living Spring.
Barton, H., Vankleek Hill.
Bean, H. W., Haysville.
Beckett, H. L., Hamilton.
Bell, D. T., Glanford Sta.
Bell, G. R., Glanford Sta.
Bell, H. G., Guelph.
Bengough, W. L., Toronto.
Bergin, Fred., Ormond.
Bingeman, G. W., Bloomingdale.
Binnie, T. H., Bunessan.
Bissonnette, A., Lancaster.
Boddy, Robt. A., Guelph.
Boutwell, W. A., Barre, Vt.
Bowes, L. A., Strathnairn.
Bowman, E., Vernon, B.C.
Bracken, J., Seely's Bay.
Bray, C. I., Ag. Coll., Miss.
Bray, R. N., Nashville.
Breckon, W. D., Waterdown.
Broderick, A. D., St. Catharines.
Broderick, F. W., Truro, N.S.
Brodie, G. A., Bethesda.
Broome, A. H. S., Hersham, Eng.
Brown, L. A., Aylmer.
Brown, S. P., Birnam.
Brown, W. A., Meaford.
Brown, W. J., Toronto.
Brownridge, J. W., Ashgrove.
Brush, Geo., Owatanna, Minn.
Buchanan, D., Florence.
Buchanan, J., Guelph.
Bunting, T. G., St. Catharines.
Burns, J. H., St. Mary's.
Burritt, M. R., Stratford.
Butler, G. C., Witham, Eng.
Caesar, L., Mono Road.
Cameron, R. R., Ailsa Craig.
Campbell, J. A., Simcoe.
Campbell, M. A., Zimmerman.
Carleton, J. A., Avening.
Carpenter, G. H., Fruitland.
Carpenter, J. F., Fruitland.
Carr, S., Sarnia.
Chisholm, J., Antigonish, N.S.
Chisholm, T. B., Hamilton.
Clancey, R. H., Souris, Man.
Clark, A., Guelph.
Clark, E. E., Meaford.
Clark, G. H., Dept. of Ag., Ottawa.
Clark, J. A., Bay View, P.E.I.
Clarkson, F. L., Sweaburg.
Clowes, F. A., Toronto.
Coglon, M. F., Bath.
Coke, E. F., Guelph.
Collen, H., Kinmount.
Conn, J. A., Heathcote.
Cooley, R. B., Canifton.
Cooper, W. W., Kippen.
Counsell, N., St. David's.
Craig, H. A., North Gower.
Craig, J., Guelph.
Craig, R. D., Ottawa.
Crawford, A. E., Guelph.
Creelman, G. C., Guelph.
Crow, J. W., Welland.
Culham, H. A., Oakville.
Cumming, M., Truro, N.S.
Cunningham, C., Oil Springs.
Curran, G. B., Orillia.
Cutler, E. B., Birnam.
Cutler, G., Birnam.
Davis, A. J., Woodstock.
Dawson, R. W., Toronto.
Day, Prof. G. E., Guelph.
Day, W. H., Guelph.
Deachman, R. J., Calgary, Alta.
Dean, Prof. H. H., Guelph.
de Cordova, A., Guelph.
de Coriolis, E. G., Guelph.
DeLong, H. M., Brooklin.
Devitt, I. I., Freeman.
Diaz, G., Guelph.
Diaz, P., Guelph.
Dickson, J. R., Seaforth.
Dolsen, Wm. J., Chatham.
Douglas, D., Guelph.
Dowling, J. E., Guelph.
Duff, H. C., Dobbinton.
Duffy, C., Nauwigewauk. N.B.
Duncan, R. S., Huntsville.
Eddy, E. D., Toronto.
Edwards, Prof. S. F., Guelph.
Elford, F. C., Ottawa.
Emmett, A. J., Southend.
Esmond, C. W., Sussex, N.B.
Evans, Jno., Randolph.
Evans, Jno., Guelph.
Evans, L., Lawrence Sta.
Evens, N., Randolph.
Fairbairn, J. B., Guelph.
Fairweather, F. H., Alma.
Farlinger, W. K., Morrisburg.
Fawcett, C. Fred., Upper Sackville, N.B.

MEMBERS FOR 1905-1906.—*Continued.*

Feather, A., Brantford.
Ferguson, Jas., Dalmeny.
Ferguson, J. E., Ottawa.
Fielding, J. G., Russell.
Foote, C. Perry, Lawrencetown., N.S.
Foster, N., Toronto.
Fowler, R. C., Emerald.
Foyston, C., Minesing.
Francis, W. A., Cannington.
Frier, G. M., Shediac, N.B.
Fuller, S. G., Charlotte, Mich.
Fulmer, H. L., Guelph.
Gamble, W. P., Guelph.
Gandier, M., Lion's Head.
Garland, Simpson, Montreal, Que.
Gilmour, J. D., Doe Lake.
Glidden, E. K., Compton, Que.
Goble, F., Woodstock.
Goodchild, A., Craigleith.
Gorrell, G. H., Gore Bay.
Graham, R. R., Mitchellville.
Graham, W. R., Guelph.
Gregory, C. G., Port Dalhousie.
Groh, H., Preston.
Grundy, C. J., Aylmer West.
Gunn, W. H., Toronto.
Hair, W. S., Watford.
Hall, T. L., Weissenburg.
Hamer, R. S., Toronto.
Hammond, H. S., Canterbury, Eng.
Hand, J. A., Toronto.
Hankinson, L. D., Grovesend.
Harcourt, Prof. R., Guelph.
Hare, Jas. H., Cobourg.
Harkness, A. D., Irena.
Harkness, J. C., Annan.
Harris, J. C., Silverton, B.C.
Harris, R., Rockwood.
Hart, F. C., Wallace Bay, N.S.
Hartman, W. J., Woodbridge.
Hayes, J. A., Sheffington., Que.
Hibberd, G., New Windsor, Md.
Hodgins, E. L., Portage du Fort, Que.
Hodson, R. W., Ottawa.
Holtermann, R. F., Brantford.
Holtermann, W. I., Brantford.
Hopkins, R. E., Lindsay.
Hotson, J., Guelph.
Houser, H. W., Campden.
Howes, A. W., Harriston.
Hoy, B., Bristol, Mass.
Hudson, H. F., Guelph.
Hunt, Wm., Guelph.
Hutcheson, J. R., Slate River.
Hutt, Prof. H. L., Guelph.
Ingram, F. H., Grovesend.
Irvine, W. H., Habermehl.
Iwanami, J., Guelph.
Jackson, V. W., Guelph.
Jackson, W. J., Fulton.
Jacobs, W. S., Minesing.
James, J. L., Guelph.
Jarvis, C. D., Ithaca, N.Y.
Jarvis, T. D., Guelph.
Jenkinson, L. H., Toronto.
Jenkinson, R. H., Toronto.
Jewson, J. E., Stone Quarry.
Johnson, D. M., Toronto.
Johnson, J. W., Guelph.
Johnston, J. P., Fingal.
Jones, D. H., Bedford Park.
Kendall, E., Guelph.
Ker, J. P., St. George.
Kerr, W. A., Ashburn.
Kerr, W. L., Guelph.
Kidd, D. F., Egbert.
Kitchen, A. F., St. George.
Klinck, C. R., Victoria Square.
Klinck, L. S., Ste. Anne de Bellevue, Que.
Knight, A. A., Brackenrig.
Laird, J. O., Blenheim.
Lang, J. E., Guelph.
Langley, Jno., Guelph.
La Pierre, L. A., Paris.
Laughland, J., Hartney, Man.
Law, I. F., Solina.
Lawrence, C. A., Stratford.
Lawrence, C. D., Sprucedale.
Lawson, E. V., Dunlop.
La Claire, J. M., St. Hyacinthe, Que.
Le Drew, H. H., Guelph.
Lennox, W. J., Newton Robinson.
Leslie, Frank, Esquesing.
Lewis, F. G., Toronto.
Lewis, H. S., Eastcote, Eng.
Lochhead, Prof. Wm., Guelph.
Logan, F. M., Victoria, B.C.
McBeath, R. J., St. Francois Xavier, Man
McCallum, E. G., St. Elmo.
McCallum, J. M., Shakespeare.
McCarthy, D. J., Kingston.
McConkey, N. H., Bayham.
McCready, Prof. S. B., Guelph.
McDiarmid, H. S., Fingal.
McDonald, J. C., Montreal, Que.
McDonald, T. D., Olinda.
McEwen, C. F., Byron.
McFayden, H., Toronto.
McGill, H. W., Everett.
McIntyre, N. H., Paisley.
McKay, K. G., Heathbell, N.S.
McKenney, A., Corinth.
McKenzie, D., Vancouver, B.C.
McKenzie, D. A., Queen Hill.
McKillican, W. C., Calgary, Alta.
McLaren, A., Guelph.
McLennan, A. H., Trafalgar.
MacMillan, H. R., Aurora.
MacRae, D. E., Cumberland.
McVannel, A. P., St. Mary's.
Manton, G., Eglinton.
Marsh, G. F., Guelph.
Mason, A. W., Berlin.
Mason, T. H., Straffordville.
Mayberry, H., Ingersoll.
Meek, M. W., Port Stanley.
Middleton, J. R., Clinton.
Middleton, M. S., Vernon, B.C.
Miller, H. H., Ottawa.
Miller, N. E., Creek Bank.
Mills, P. G., Sussex, N.B.

MEMBERS FOR 1905-1906.—*Continued.*

Mills, R. W., Toronto.
Monteith, Hon. Nelson, Toronto.
Mooney, John, Valley River, Man.
Moodie, C., St. George.
Moore, R., Norwich.
More, Jas., Kirkton.
Morewood, J. R., Inglewood, N.J.
Morgan, G. E., Kerwood.
Mortimer, R. E., Honeywood.
Morton, Wm., Bethany.
Mulloy, G. A., Aurora.
Munro, J., Clifford.
Munro, W. A., Chesterville.
Murray, Chas., Avening.
Murray-Brown, O., Guelph.
Nag-Tany, B. R., Toronto.
Neethling, H. J., Guelph.
Nelson, J. R. B., Sorel, Que.
Newman, L. H., Ottawa.
Nicholson, Chester, Mt. Forest.
Nixon, C. C., St. George.
Oliver, D. M., Toronto.
Owen, Wm. C., Thornton.
Palmer, B. G., Norwich.
Palmer, W. E., Marshville.
Partridge, A. W., Crown Hill.
Patch, A. M., Guelph.
Peart, H. S., Guelph.
Peer, W. M., Freeman.
Pettit, F. E., Burgessville.
Pettypiece, W., North Gower.
Pickett, B. S., Champaign, Ill.
Potter, W. F., Manotick.
Prinsep, G., Freeman.
Procunier, G. A., Bayham.
Putnam, G. A., Toronto.
Raynor, T. G., Ottawa.
Reed, F. H., Guelph.
Reyles, C. M., Guelph.
Reynolds, Prof. J. B., Guelph.
Rivett, T., Guelph.
Robertson, G. A., St. Catharines.
Robinson, J. D., Washington, D.C.
Rose, D. M., Guelph.
Ross, H. E., Strange.
Row, C. A., Langhorne, Pa.
Russell, C. J., Ballinafad.
Ryan, W., Guelph.
Sager, J. L., St. George.
Salkeld, B. G., Goderich.
Salkeld, J. W., Goderich.
Sanders, G. E., Round Hill, N.S.
Scott, H. W., Lancaster.
Shand, C. H., Port Dover.
Shantz, Allen, Waterloo.
Sharman, W. W., Winnipeg, Man.
Sherman, Prof. F., Guelph.
Shoemaker, C. B., Mt. Pleasant.
Shopland, N. J., North Sannich, B.C.
Shuh, C. H., Waterloo.
Silcox, F. H., Iona.
Sirett, A. W., Rosseau.
Sirett, H., Rosseau.
Slater, A. E., Guelph.
Smith, J. E., Shallow Lake.
Smith, R. B., Columbus.
Smuck, I., Renforth.
Smye, G. C., Ayr.
Somerset, H. P., Burford.
Spencer, J. B., Ottawa.
Springer, S., Guelph.
Sproat, M. S., Mansfield.
Squirrell, Wm., Guelph.
Squirrell, W. J., Guelph.
Stafford, E. W., Toronto.
Steckley, J. C., Bethesda.
Stewart, W. F., Strath Gartney, P. E. I.
Stock, M. G., Toronto.
Stott, L., Wyevale.
Stratton, R. W., Guelph.
Taylor, Geo., Guelph.
Taylor, F., Cumberland Mills, Que.
Tcherniac, J., Guelph.
Templer, Wm., Jerseyville.
Thom, C. C., Guelph.
Thompson, H. H., Heathcote.
Thompson, Hugh, Jr., Magnetawan.
Thompson, W. R., Derwent.
Thompstone, E., Guelph.
Timpany, A., Calton.
Treherne, R. C., Guelph.
Treichler, M. W., Sanborn, N.Y.
Tucker, H. S., Chapman.
Tufford, L. B., Beamsville.
Turney, A. G., Guelph.
Tweltridge, T. H., Guelph.
Twigg, C. B., New Denver, B.C.
Waddell, W. M., Kerwood.
Walker, W. E., Carluke.
Walker, Wm., Guelph.
Warner, Geo., Coulson.
Warren, F. B., Gamebridge.
Waters, B. J., Ivan.
Watson, J. H., Brampton.
Webster, H. B., Science Hill.
Weekes, H. M., Glencoe.
Wells, E. A., Chilliwack, B.C.
Westover, C. A., Frelighsburg, Que.
Wheaton, R. R., Thorndale.
Wheeler, H. C., Hubbard, Ohio.
White, F. E., Cincinnati, Ohio.
White, G. G., Perth.
Whiteside, A. E., Guelph.
Wiancko, A. T., Lafayette, Ind.
Wiancko, T. A., Sardis, B. C.
Wilkinson, P. J., Cambray.
Williams, R. H., Dundalk.
Wilson, E. E., Caledon.
Witter, G., Guelph.
Wolverton, H. A., Brandon.
Woods, J., Welsford Station, N.B.
Yeo, F. T., Ryckman's Cors.
Yeo, W. J., Ryckman's Cors.
Young, A., Glanford.
Young, W. H., Thornton.
Zavitz, Prof. C. A., Guelph.
Zavitz, C. J., Fork's Road.
Zavitz, E. J., Guelph.
Zavitz, H. V., Coldstream.
Zubiaur, A., Buffalo, N.Y.

The Ontario Agricultural and Experimental Union.

OFFICERS FOR 1905-1906.

President	Geo. Robertson, St. Catharines, Ont.
Vice-President	J. M. McCallum, Shakespeare, Ont.
Secretary and Editor	C. A. Zavitz, Agricultural College, Guelph.
Assistant Secretary	J. Buchanan, Agricultural College, Guelph.
Treasurer	H. L. Hutt, Agricultural College, Guelph.
Directors	G. C. Creelman, Hon. Nelson Monteith, G. A. Putnam, Geo. A. Brodie, J. O. Laird, and J. W. Crowe.
Auditors	H. Arkell and R. W. Hodson.

Committees on Experimental Work.

Agriculture	J. Buchanan (Director), W. J. Squirrell, A. E. Whiteside and H. G. Bell.
Horticulture	Prof. H. L. Hutt (Director), H. S. Peart, and J. A. Hand.
Poultry	W. R. Graham (Director), Geo. Robertson, and F. C. Elford.
Forestry	E. J. Zavitz (Director), Dr. J. F. Clark, R. D. Craig, and E. C. Drury.
Chemistry	Prof. R. Harcourt (Director), Geo. McCalla, and G. Fred. Marsh.

ANNUAL MEETING.

The twenty-seventh annual meeting of the Ontario Agricultural and Experimental Union was held at the Ontario Agricultural College, Guelph, on Monday, Tuesday, and Wednesday, December 11th, 12th, and 13th.

The President of the Union, Mr. F. C. Elford, Department of Agriculture, Ottawa, presided over the regular sessions, and Mr. G. C. Creelman, President of the College, at the Annual Banquet on Tuesday evening.

REPORT OF THE SECRETARY.

In 1905, co-operative experiments were conducted on upwards of four thousand farms throughout Ontario in the departments of Agriculture, Horticulture, Farm Forestry, Poultry Raising and Agricultural Chemistry. The number of co-operative experiments in the department of Agriculture alone for the twenty years from 1886 to 1905 has reached 37,416, and is divided as follows into periods of four years:

1886-1889	292
1890-1893	2,228
1894-1897	8,174
1898-1901	12,599
1902-1905	14,123

Not only does the Experimental Union furnish financial aid to the experimenters and to the country as a whole, but it also encourages neatness and method in work, close observation, accurate calculation, thoughtful inquiry, and other important agencies which help so much in the education of the people. We believe the time will come when a somewhat similar system of co-operative experimental work along the various lines of agriculture will be conducted in many of the countries of the world. From a letter received from Prof. R. A. Moore, University of Wisconsin, under date of December 1st, 1905, I make the following quotation: "Your work is certainly commanding attention all over North America, and I wish you Godspeed in the worthy cause. The Wisconsin Agricultural Experimental Association, which is patterned after your organization, is doing a grand work for the people of our State. No one thing at the present is commanding so much attention along the line of advanced agricultural effort in Wisconsin as the efforts put forth by the young men who belong to this Association." Not only in Wisconsin, but also in New York, Illinois, Ohio, Nebraska, Iowa, Kansas, California, and Texas have similar organizations been established recently.

We now have in Ontario ex-students of the Agricultural College and other progressive farmers, to the number of over 4,000 who are conducting co-operative experiments upon their own farms. We can see the great influence which this work is exerting on the agriculture of the Province. We have evidence that the system adopted is being approved in other lands as well as in our own. Let us exert our best efforts, therefore, to make our work even more perfect, more comprehensive and more influential.

TREASURER'S REPORT, 1905.

Receipts.		Expenditure.	
Balance from 1904	$ 22 88	Agricultural experiments	1,235 11
Membership Fees	186 00	Horticultural experiments	409 23
Government Grant	2.000 00	Chemical experiments	48 41
		Part expenses Annual meeting, 1904	140 93
		Part expenses Annual meeting, 1905	107 50
		Meeting of Executive	4 30
		Total	$1.945 48
		Balance on hand	263 40
Total	$2.208 88		$2.208 88

We, the undersigned Auditors, declare that we have examined the Treasurer's accounts, and found them correct.

W. Lochhead,
W. P. Gamble,
Auditors.

December 8th, 1905.

PRESIDENT'S ADDRESS.

By F. C. Elford, Department of Agriculture, Ottawa, Ont.

I am glad to welcome you to the 27th annual session of our Experimental Union. The Experimental Union is a school in itself. It is an extension of the Agricultural College work, and the only way to get the whole of the extended course is to become an experimenter. Every experiment carried through has been beneficial not only in adding to the knowledge of the experimenter, but just so far as he has carried it through to the minutest detail is he a better man than he was a year ago.

It is pleasing to know that so many ex-students are connected with the Experimental Union. Though the ex-student is probably not criticised today in the same sense that he was ten years ago, yet he is criticised, and it is encouraging to see how he is bearing the criticism and becoming a leader of agricultural thought and practice, not only in Canada but abroad. The safest way an ex-student can rise above unfavorable criticism is to successfully carry out one experiment each year.

As has been stated, the highest position an ex-student can fill is to successfully operate his own farm, and the past year has proven, that from an Ontario farm an ex-student can reach the highest position for agricultural usefulness in the gift of the Province. We, as ex-students, congratulate Ontario farmers in having as Minister of Agriculture, a man trained in our Institution, a man whose fitness for the position is conceded by all, and whose principles and strength of character are beyond question. The agricultural interests of Ontario will continue to prosper with such a man at its head as Hon. Nelson Monteith. The Minister's reported intention to establish an experimental farm in New Ontario will undoubtedly meet with our approval. One cannot fail to note the general agricultural prosperity prevailing throughout Ontario and Canada, and we come to our annual union determined that next year we will put forth a greater effort to carry out to the full our various experiments.

The work of the Union has been very encouraging. The number of successful experimenters has gradually increased until now we have over 4,000. The value of the work can not be over-estimated. It has been instrumental in introducing better and more productive varieties of grain, better systems of cultivation, etc. Whole communities have benefited by one man's experimental work. During the past year new lines of experiments have been conducted. Some in muck soils that should be very beneficial are being carried on by Prof. Harcourt. Mr. E. J. Zavitz, B.A., has been conducting experiments in forestry. The reports from these, as well as from the other directors, will be read and you will discuss them. A full discussion is expected, and if anything suffers from lack of time it must not be the reports. I believe the time is not far distant when such reports and discussions will constitute the program. This is primarily the work of the Union—this and reuniting of the ex-students. I am sure you will be pleased to know that through the goodness of President Creelman arrangements have been made by which the ex-students may spend one social evening together.

One matter that will come before you for consideration will appeal to every ex-student. It is in reference to a retiring allowance, due our esteemed ex-president, Dr. Mills.

The future of the Union work will be considered by you, and there ought to be suggestions along this line that will assist the executive. As a rule each experimenter is given one experiment only, and each set of experiments is duplicated in the experimental plots here by Prof. Zavitz. Would it be a step in the right direction to have one or two complete sets of experiments conducted in each county, or more especially those counties remote from the College? Prof. Zavitz could, I have no doubt, locate men in every county who by their previous work have shown their ability to do this. Let these men be paid something for their trouble. Have these experiments inspected as the plots in the fair grounds are inspected. Many do not see the plots here, but if some such plan were followed the practical illustration would reach further. The sets of experiments from each county could be reported the same as those conducted on the College farm.

I have also thought that though much good is being done through the plots on the fair ground, even more information might be obtained if farmers in the vicinity of the various fairs could be induced to grow similar plots and bring collections of these to the fairs, where they could be in competition with that which was grown on the fair grounds.

In view of the increasing prevalence of noxious weeds, could not experiments be suggested dealing with the best method of their extermination, such as is being done in the case of wild mustard?

Additional work means additional expense. Last year our grant was $2,000, a small amount for the extent of the influence of the work—about $1 for every $80,000 worth of crops affected. I don't think any organization can show a better return for the money invested. For this we are particularly indebted to our worthy secretary, Prof. Zavitz, and in turn to each of you who have helped in these experiments. I have great pleasure in welcoming you all to our meeting, and if each one of you will see the matter as did the old woman who said, "It is always a good meeting if I take part," this meeting will be an unbounded success.

RESULTS OF CO-OPERATIVE EXPERIMENTS IN AGRICULTURE.

By Prof. C. A. Zavitz, Agricultural College, Guelph.

As director of the co-operative experiments in Agriculture, I beg to submit the report of the work conducted throughout Ontario in 1905. I am pleased to state that we have received a larger number of good reports during the past year than on any previous occasion. This is what we would naturally expect. The co-operative work of the Experimental Union has long passed its experimental stage. We have a large number of ex-students and others who have conducted experimental work successfully for eight, ten, and twelve years, and are becoming so trained in the work that they are doing service which is not only of advantage to themselves but to the country as a whole. It is impossible to estimate the value and the influence of this work in connection with the agriculture of our Province. The experimenters deserve great credit for their work in successfully conducting the various experiments, and the farmers as a whole owe much to these men who are reporting the results of their carefully conducted investigations from year to year. The summary results of these co-operative experiments, which are to be presented and discussed at the different sessions of this annual meeting of the Experimental Union, are submitted with a good deal of confidence as to their value in furnishing information which should prove very serviceable as a general guide in connection with the practical agriculture of Ontario.

As there are probably some in attendance at the meeting and many others who will read the annual report who are not familiar with our system of co-operation along the various lines of agricultural experimental work, we give a brief outline of the Experimental Union in connection with the Agricultural College and of the co-operative experimental work in connection with the Union. The experimental work at the College was commenced in 1876, just two years after the establishment of the College itself. These experiments have been increased from year to year, and now include work along the various lines of agriculture. In the experiments with farm crops, upwards of 2,000 plots are used annually in growing grains, fodders, grasses, clovers, roots, and potatoes, with the object of obtaining information regarding the best varieties, the most productive selections of seed, the best dates of seeding, the most improved methods of cultivation, the most economical ways of increasing the fertility of the soil, etc.

Five years after the College was started, the officers, students, and ex-students formed themselves into an association under the name of the "Ontario Agricultural and Experimental Union." The objects of the association, as formulated at that time, were as follows: "To form a bond of union among the officers and students, past and present, of the Ontario Agricultural College and Experimental Farm; to promote their intercourse with the view to mutual information; to discuss subjects bearing on the wide field of agriculture, with its allied sciences and arts; to hear papers and addresses delivered by competent parties; and to meet at least once annually at the Ontario Agricultural College." In 1886 the members of this association appointed a committee to confer with the officers of the College, with the object of establishing a system of co-operative experiments throughout the Province. Letters were written to members of the Union, and twelve consented to conduct experiments with fertilizers and field crops on their own farms in the year 1886. From that time to the present, the work has gradually branched off along different lines until it has touched on several phases of agricultural work.

In the spring of each year, circulars, outlining the co-operative work, are distributed by the agricultural committee appointed by the Experimental Union. Those asked to take part in the scheme of co-operation may be classified as follows: (1) The officers and students, past and present, of the Ontario Agricultural College, who pay an annual fee of 50 cents, and have control of the executive work of the Experimental Union; (2) the experimenters of former years who have done satisfactory work; (3) leading farmers, gardeners, and others, whose names have been suggested by secretaries of Farmers' Institutes, secretaries of Agricultural Societies, principals of Collegiate Institutes, inspectors of Public Schools, and others; and (4) various persons who have seen the experiments of other people, or have in some way heard of the work and wish to assist in the movement by conducting experiments on their own farms. The circulars are distributed in the order here given, starting first by sending to those who have been connected with the College and are therefore trained for the work, and finishing the distribution by sending to those engaged in some branch of practical agriculture who have not conducted Experiments previously but who wish to undertake the work.

From the beginning, the co-operative experimental work of the Union has been directed and controlled by circulars and letters, printed and written, which have been transmitted through the mails. When personal visits have been made to the experimenters, the object has been to enable the director to study the difficulties of those actually engaged in the work, and thus to be in a better position to know the best methods to adopt in the printed instructions, rather than to take any part in the immediate control of the practical operations of the experiments.

Every man is made responsible for his own experiment, and is urged to do the very best he can for himself, for his neighbors, and for the Union. Many persons who at first took but little interest in the experiments, have afterwards proven themselves to be most valuable experimenters, and have shown great care and accuracy in the details of their work. The names of those who conduct the experiments with the proper amount of care and accuracy are placed on the list of successful experimenters, and these individuals are carefully looked after in the future. It will, therefore, be seen that the Experimental Union makes a study of the men themselves as well as of the products of their labor. The education of the men in the development of accurate methods, careful observation, and a deeper interest in the occupation of farming is one of the objects of the co-operative experimental work in Ontario. I have no hesitation in saying that the results which have been obtained along this line alone are of far greater value than the entire cost of the co-operative work of the past seventeen years.

No direct financial help is offered any person to undertake and carry through the co-operative work. It is purely a volunteer movement from the start to the finish. The materials for the experiments, the instructions for making the tests, and the blank forms for reporting the results are furnished free of cost to those who ask to join in the work and who sign the agreement furnished by the Union. Experimenters in crop production use the soil on their own farms, conduct the experiments themselves, and report the results to the director of that particular branch of co-operative work in which they have enlisted. In those experiments in which crops are produced, the produce is retained by the experimenters as their personal property, except any small quantities which are returned to the college as samples.

The cost of the co-operative experiments is paid conjointly by the station and the Union. The station pays for most of the labor and for some of the material, and the Union for all of the stationery, printing, postage, expressage, etc., as well as for part of the material required to carry on the co-operative work.

In 1905, the work has been carried out along thirty-five distinct branches of field agriculture, thus covering practically all of the crops which are grown on the ten million or more acres of the cultivated land of Ontario. As in 1904, a large number of experiments have been conducted in New Ontario· There is scarcely a settlement of farmers in the northern part of the Province that has not received seed, and has from one to twenty or thirty of its number actually engaged in the experimental work. For instance, there were exactly forty-eight experimenters in the Temiscaming District in 1905. When I visited that district this summer, I realized more than ever the great importance of work of this kind in a new section of country. Some of the settlers had been careless in the seed which they had sown, and some of the most troublesome weeds were getting a foothold in the clearings. The farmers of the district were very enthusiastic regarding the experimental work and we could already see the good influence of the Union work of the past two or three years in those settlements which were visited. It is impossible to estimate the great value of this work in supplying seed of the best varieties of farm crops, in encouraging improved methods of agriculture, and in starting the people in the new country to experiment and investigate for themselves along the lines of their life work. The following gives the list of the thirty experiments with spring sown crops and of the five experiments with autumn sown crops, making in all thirty-five distinct experiments conducted in 1905; it also indicates the number of plots required for each experiment.

Co-operative Experiments in Agriculture in 1905.

Grain Crops.

	PLOTS.
1—Testing three varieties of Oats	3
2—Testing two varieties of Barley	2
3—Testing two varieties of Hulless Barley	2
4—Testing two varieties of Spring Wheat	2
5—Testing two varieties of Buckwheat	2
6—Testing two varieties of Field Peas for Northern Ontario	2
7—Testing Emmer and Spelt	2
8—Testing two varieties of Soy, Soja, or Japanese Beans	2
9—Testing three varieties of Husking Corn	3

Root Crops.

10—Testing three varieties of Mangels	3
11—Testing two varieties of Sugar Beets for feeding purposes	2
12—Testing three varieties of Swedish Turnips	3
13—Testing Kohl Rabi and two varieties of Fall Turnips	3
14—Testing Parsnips and two varieties of Carrots	3

Forage, Fodder, Silage and Hay Crops.

15—Testing three varieties of Fodder or Silage Corn	3
16—Testing three varieties of Millet	3
17—Testing three varieties of Sorghum	3
18—Testing Grass Peas and two varieties of Vetches	3
19—Testing two varieties of Rape	2
20—Testing three varieties of Clover	3
21—Testing Sainfoin, Lucerne, and Burnet	3
22—Testing seven varieties of Grasses	7

Culinary Crops.

23—Testing three varieties of Field Beans	3
24—Testing three varieties of Sweet Corn	3

Fertilizer Experiments.

25—Testing fertilizers with Corn	6
26—Testing fertilizers with Swedish Turnips	6

Miscellaneous Experiments.

27—Growing Potatoes on the level and in hills	2
28—Testing two varieties of early, medium, or late Potatoes	2
29—Testing three grain mixtures for grain production	3
30—Planting Corn in rows and in squares (an excellent variety of Early Corn will be used)	2

Autumn Sown Crops.

1—Testing Hairy Vetches and Winter Rye as fodder Crops	2
2—Testing three varieties of Winter Wheat	3
3—Testing five fertilizers with Winter Wheat	6
4—Testing autumn and spring applications of nitrate of soda and common salt with Winter Wheat.	5
5—Testing two varieties of Winter Rye for grain production	2

The most of the plots were one rod wide by two rods long, being exactly one-eightieth of an acre in size. The largest plots used in 1905 contained sixteen square rods and were therefore one-tenth of an acre each. Formerly some of the plots were one-half of an acre in size but these gave less satisfaction than the smaller ones. The results of the co-operative tests were examined very carefully, and those which were complete and which showed carefulness and reliability throughout were summarized. While these summaries should be of great value to the farmers generally, still those who conducted the experiments themselves obtained much additional information regarding the results of their experiments as adapted to their individual circumstances, which it is impossible to convey in a concise report of this kind.

The average results of the co-operative experiments which were successfully conducted throughout Ontario in 1905 with grain crops, field roots, fodder crops, hay crops, potatoes, application of fertilizers, methods of cultivation, etc., are here presented.

GRAIN CROPS, 1905.

Experiments.	Varieties.	Comparative value.	Yield per acre.		
			Straw.	Grain.	Grain.
			tons.	lbs.	bush.
Oats (120 tests)	Joanette	98	1.59	1,822	53.58
	Siberian	100	1.48	1,647	48.45
	Daubeney	78	1.30	1,560	45.88
	Tartar King	95	1.45	1,546	45.46
Six-rowed Barley (28 tests)	Mandscheuri	100	1.22	1,811	37.73
	Oderbrucker	68	1.10	1,647	34.32
Hulless Barley (13 tests)	Black Hulless	100	1.40	1,478	24.63
	Guy Mayle	86	1.35	1,388	23.13
Spring Wheat (24 tests)	Wild Goose	100	1.98	1,492	34.87
	Red Fife	97	1.91	1,362	22.69
Emmer and Spelt (19 tests)	Common Emmer	100	1.39	1,598	39.94
	Red Spelt	69	1.34	1,276	31.90
Buckwheat (7 tests)	Japanese	100	3.78	1,800	37.50
	Silver Hull	100	3.26	1,563	32.58
Field Peas (19 tests)	Early Britain	100	1.22	1,699	28.32
	New Canadian Beauty	85	1.70	1,650	27.51
Field Beans (20 tests)	New Prize Winner	100	.58	1,633	27.21
	Marrowfat	77	.77	1,368	22.80
	California Pea	66	.71	1,341	22.35
Soy Beans (2 tests)	Early Yellow	100	1.85	1,100	18.33
	Medium Green	85	4.30	1,040	17.33
Winter Wheat (14 tests)	Dawson's Golden Chaff	100	1.57	1,390	23.16
	Imperial Amber	76	1.82	1,333	22.22
	Michigan Amber	76	1.78	1,303	21.71
	Buda Pesth	38	1.58	1,265	21.08
	Turkey Red	38	1.87	1,203	20.05
	Banatka	43	1.79	1,164	19.40
			whole crop.		
Corn for Grain (17 tests)	Compton's Early	100	10.38	3.178	56.74
	Salzer's North Dakota	95	9.04	2.989	53.37
	King Phillip	69	9.25	2,754	49.17
			straw.		
Mixtures (11 tests)	Daubeney Oats, 34 lbs. per acre Mandscheuri Barley, 48 lbs. per acre	100	2.04	2,073	......
	Siberian Oats 34 " Chevalier Barley 48 "	71	2.24	1,858	......
	Siberian Oats 25 " Chevalier Barley 35 " Wild Goose Spring Wheat, 22 lbs. per acre	58	2.20	1,767	......

In the first column of figures in the table here presented the comparative values of the different varieties are given, 100 representing the most popular variety in each class of crop. These figures form the summary of the answers given by the experimenters in regard to the relative value of each variety as the result of the individual tests throughout the Province, when the various characteristics of the different varieties were all taken into consideration. The yield of straw as here reported represents the total crop less the amount of grain, and would, therefore, include the chaff with the straw. The yield of grain is given in pounds and also in bushels per acre, in order that the results might be more clearly understood and that comparisons might be made with the different crops as well as with the varieties. As the weight per measured bushel of the different crops varies so much, it is easier to compare the results of the crops in *pounds* than in *bushels* per acre.

Oats. In the spring of 1905, four varieties of oats were distributed throughout Ontario for co-operative experiments. Good reports of satisfactorily conducted experiments were received from no less than one hundred and twenty experimenters in the autumn of the present year. This number of good reports has been exceeded but once within the last fifteen years. It will be seen from the figures here presented that the Joanette black oats head the list with 53.6 bushels per acre. The Joanette oats had not been distributed for several years until the present season. When formerly used in the co-operative experiments, they usually occupied an intermediate place, owing to their very short straw, thus making them unsuitable for the average soil of the Province. As we had selected heads from some of the long plants from which we produced seed, we again entered this variety among those used for the co-operative work and find that in 1905 it surpassed the Siberian by an average of fully 5 bushels per acre. The straw of the Joanette variety, however, being yet comparatively short and the grain black in the hull, no doubt had an influence in inducing the experimenters to place the Siberian ahead of it as a popular variety. The Daubeney, which occupies third place on the list, gave an average of about two and a half bushels per acre less than the Siberian and about one-half bushel more than the Tartar King. It is an exceedingly early variety and one well suited for mixing with the Mandscheuri barley when it is desired to grow both oats and barley together for grain production. The Daubeney is one of the best of the very early oats which has been grown at the College. The Tartar King variety did not give as good results comparatively in 1905 as it did in the year previous. It is very stiff in the straw but is also thick in the hull. The Experimental Department at the College has been instrumental in producing hybrids of the Joanette and the Siberian varieties of oats, and it is hoped that new varieties, possessing the good and eliminating the poor qualities of these two varieties, may be obtained.

Six-rowed Barley. Two very excellent varieties, of six-rowed barley were distributed in the spring of the present year. The Mandscheuri variety was imported from Russia and the Oderbrucker from Germany in the spring of 1889. These are two of the very heaviest producers of all the varieties of six-rowed barley which have been under test at the Experimental Farm at Guelph. In the average of twenty-eight successfully conducted experiments over Ontario during the past year, it is seen that the Mandscheuri gave 37.7 and the Oderbrucker 34.3 bushels per acre, or an average of about 3½ bushels per acre in favor of the Mandscheuri. The last named variety also produced the great amount of straw and was decidedly the more popular variety of the two. The Mandscheuri barley has been distributed over Ontario for several years and is now grown very extensively throughout the Province. The writer is not aware that there is any Mandscheuri barley now grown in Canada except that which has resulted from the seed introduced through the medium of the Agricultural College and the Experimental Union. We now have an improved strain of this excellent variety which is exceedingly promising and which we hope to distribute throughout Ontario in the spring of 1906.

Hulless Barley. Hulless barley has been grown to a considerable extent in some parts of Ontario in recent years. Some fourteen varieties in all have been under experiment at the Agricultural College. The Black Hulless is the oldest and the best known variety in Ontario. It is, however, rather weak in the straw, as is the case with most of the hulless barleys. The Guy Mayle, which is of a bluish color, has given very good results indeed in the trial grounds at Guelph. It has given a greater yield per acre and has produced a stiffer straw than the Black Hulless variety. It was distributed in 1904 for the first time, and in that year surpassed the Black Hulless, but in the average of thirteen experiments in 1905 it produced about one and a half bushels per acre less than that variety. We expect to distribute an improved strain of the Guy Mayle barley next spring.

Spring Wheat. The season of 1905 was undoubtedly more favorable for the growth of spring wheat than that of 1904. In the average results of the experiments throughout Ontario, the Wild Goose gave 24.9 and the Red Fife 22.7 bushels per acre, as compared with 19.5 for the Wild Goose and 9.8 bushels for the Red Fife in 1904. The Wild Goose has proven to be one of the best yielding varieties grown at the College or distributed throughout Ontario, and is specially suited for the manufacture of macaroni. The Red Fife is a variety which is grown very extensively in Manitoba and the Northwest and produces a large quantity of what is known as the Manitoba No. 1 Hard. It is also one of the best spring wheats in Ontario for yield per acre and for flour production. The Wild Goose was decidedly more popular than the Red Fife in 1904 and slightly more popular than that variety according to the report of the present year. We are pleased to state that we have crossed the Red Fife and the Herison Bearded varieties at the College and have some very interesting and promising hybrids.

Emmer and Spelt. As the result of reports sent out in former years, it should be pretty generally known throughout the Province that Emmer and Spelt are two distinct types of wheat, there being a number of varieties belonging to each type. Emmer has been grown quite extensively in some districts of Ontario under the name of Spelt. For a comparative description of these two grains, the reader is referred to the report of the Professor of Field Husbandry in the Annual Report of the Ontario Agricultural College for 1905. It is quite probable that the Emmer will be grown considerably throughout Ontario for the production of good, clean straw and a large yield of grain to be used as a feed for live stock. It is very productive, producing in some seasons a greater yield of grain than even the best varieties of oats or the best barley. In the co-operative experiments over Ontario in 1905, however, the Emmer did not give quite as large a yield as either of two varieties of oats or the best varieties of barley. When threshed there is not a clear separation of the grain and the chaff, but there is only about twenty-two per cent. of the threshed grain in the form of chaff; while the average variety of oats possesses about thirty per cent. of hull. For feeding purposes, the grain and the surrounding chaff are usually ground together in the same manner as oats are ground in meal.

Buckwheat. Buckwheat gave better results throughout Ontario in 1905 than it did at the Agricultural College. Of the two varieties distributed in the spring of the present year, it will be seen that in the average of seven tests the Japanese produced 37.5 bushels and the Silver Hull, 32.6 bushels per acre. In some seasons, the Japanese variety, and in other seasons the Silver Hull variety, gives the best results. Over a series of years, the Silver Hull barley seems to be rather more popular than the Japanese, although in 1905 these two varieties were exactly similar in popularity.

Field Peas. Two varieties of peas, the Early Britain and the Canadian Beauty, were distributed in those districts of Ontario which are as yet uninfested with the pea weevil. The average results of nineteen tests show that the Early Britain gave 28.3 and the Canadian Beauty 27.5 bushels per acre. With only one exception, the Early Britain has taken the lead in yield of grain per acre among all the varieties of peas distributed throughout Ontario for several years past. The Early Britain possesses a medium length of straw, a brown-colored grain, and is an abundant yielder.

Field Beans. In 1905 there were twenty good reports of successfully conducted experiments with field beans, as compared with ten in 1904. The results of the co-operative work with field beans during the past year have been very satisfactory. The New Prize Winner, which has given such good results at the College, has also made a high record throughout Ontario, producing an average of about 4½ bushels per acre more than the Marrowfat, and nearly 5 bushels per acre more than the California Pea bean. It was also an exceedingly popular variety among the experimenters in 1905. The New Prize Winner is a comparatively new variety, quite early in maturing, and a heavy producer of beans of good quality.

Soy Beans. The Soy bean is a comparatively new crop in Ontario. There are many varieties of this class of grain, most of which have been imported from Japan. They are grown not as a table bean but more especially as an exceedingly nutritive feed for live stock. Meal made from the Soy beans is not very different in composition from that of cotton seed meal. A small quantity of this meal added to that of oats and barley would add considerably to the nutritive properties of the mixed feed. The Early Yellow variety usually ripens its seed in Ontario; while the Medium Green Soy beans grow a much larger plant more suitable for mixing with corn in the silo than for seed production. It will be seen from the average results of the co-operative experiments that the Early Yellow gave 18.3 and the Medium Green 17.3 bushels of grain per acre. At the same time, the Medium Green furnished more than twice the amount of straw produced by the Early Yellow variety.

Winter Wheat. The results of the winter exp'riments conducted both at the College and throughout Ontario during the past year were reported in a summary form and sent to all the newspapers of Ontario about three weeks before seeding time in the autumn. It will be seen from the statement of the average results presented in the table that the Dawson's Golden Chaff was again decidedly the most popular variety of winter wheat. The Imperial Amber and the Michigan Amber each gave comparatively good results; while the Buda Pesth, Turkey Red, and Banatka were much less popular with the experimenters. The grain of the Dawson's Golden Chaff is white, and that of each of the other varieties is red. The straw of the Dawson's Golden Chaff is very stiff, that of the Imperial Amber and the Michigan Amber of medium strength, and that of the Buda Pesth, Turkey Red and Banatka comparatively weak. We are pleased to state that we now have hybrids of the Dawson's Golden Chaff and Turkey Red, and hope to be able to secure some new varieties combining the good qualities of each of these varieties.

Corn for Grain. In 1905, as in 1904, corn produced a greater yield of grain in the co-operative experiments than any other crop under test. The yield of the highest yielding variety in 1904 was 56 bushels, and that for the year 1905 was practically 57 bushels per acre. In the average results of the seventeen co-operative experiments for 1905, the Compton's Early gave the highest and King Phillip the lowest yield of grain per acre. The seed of the King Phillip variety was obtained from Essex County for the first time in 1905, and evidently a poorer strain of this variety has been obtained this season than formerly.

Mixtures for Grain Production. Some exceedingly interesting and valuable work with grain mixtures has been conducted at the Agricultural College. It has been found that a mixture of barley and oats has produced a larger yield of grain per acre than any other combination used. It has also been observed that barley and oats when grown together, nearly always give a larger yield of grain than when the same grains are grown separately. In other experiments it has been found that some varieties seem specially well suited, and others seem quite unsuitable for growing in combination. In 1905 a co-operative experiment was conducted throughout Ontario for the first time by using three different mixtures,—one with Daubeney oats and Mandscheuri barley, another with Siberian oats and Chevalier barley, and still another with Siberian oats, Chevalier barley and Wild Goose spring wheat. The experiment was conducted successfully on eleven different farms, and the average results show that the first mixture gave 2,073, the second, 1,858, and the third, 1,767 pounds of grain per acre.

It is interesting to observe that the mixture of Daubeney oats and Mandscheuri barley gave a considerably larger yield of grain per acre than either the Daubeney oats or the Mandscheuri barley when grown separately throughout the Province of Ontario in 1905. Of the three mixtures used, that of Daubeney oats and Mandscheuri barley was decidedly the most popular. These varieties, when sown in combination, ripen nicely together and form a very satisfactory mixture.

FIELD ROOTS AND FODDER CROPS, 1905.

Experiments.	Varieties.	Comparative value.	Yield per acre.
			tons.
Mangels (8 tests)	Yellow Leviathan	100	33.57
	Sutton's Mammoth Long Red	95	33.18
	Steele-Brigg's Giant Yellow Globe	63	28.47
Sugar Beets (7 tests)	Giant White Feeding	100	35.65
	Royal Giant	81	32.71
Swede Turnips (2 tests)	Sutton's Magnum Bonum	100	18.04
	Hartley's Bronze Top	85	16.64
	Kangaroo	85	14.54
Fall Turnips and Kohl Rabi (2 tests)	Red Top White Globe	100	34.53
	White Egg	80	27.43
	Early White Vienna Kohl Rabi	50	13.75

Field Roots and Fodder Crops, 1905.—*Continued.*

Experiments.	Varieties.	Comparative value.	Yield per acre.
			tons.
arrots and Parsnips (8 tests)	Mastadon White Intermediate	100	24.56
	Bruce's Mammoth Intermediate	76	23.18
	Buckbee's New Sugar Parsnip	40	15.62
odder Corn (7 tests)	Henderson's Eureka	85	17.48
	Leaming	85	12.94
	White Cap Yellow Dent	100	11.44
Millet (2 tests)	Japanese Panicle	100	16.72
	Japanese Barnyard	85	16.00
	Hungarian	72	12.02
rass Peas and Vetches (3 tests)	Grass Peas	86	10.00
	Common Vetches	100	8.93
	Hairy Vetches	100	8.65
ape (1 test)	Dwarf Essex	100	17.82
	Dwarf Bananza	85	13.75

Mangels. The season of 1905 was quite favorable to the growth of mangels in Ontario. In the average of eight experiments conducted throughout the Province with three varieties of mangels, it will be seen that the Yellow Leviathan produced 33.6, the Sutton's Mammoth Long Red, 33.2, and the Steele-Briggs Giant Yellow Globe, 28.5 tons per acre. These represent three distinct classes, namely, the long, the intermediate, and the globe. It will be remembered that the Yellow Leviathan also gave the highest yield per acre throughout Ontario in 1904, and the second highest yield in 1903, these being the first years it was used in the co-operative experiments. This variety is one of the very largest yielders of all the different kinds grown in the experimental grounds at the College.

Sugar Beets for Feeding Purposes. The seed of two large growing varieties of sugar beets was distributed in the spring of the present year. In the average results of experiments conducted on seven farms, it will be seen that both varieties produced a very heavy yield per acre, the Giant White Feeding variety giving over 35 tons and the Royal Giant nearly 33 tons per acre. Of these two varieties, the Giant White Feeding seemed to be rather the more popular among the experimenters. Such varieties as the ones here referred to produce a greater yield of roots per acre, but contain considerably less sugar than those varieties which are usually grown for sugar production.

Swede Turnips. In 1905, as in 1904, 1903, and 1902, the Sutton's Magnum Bonum produced the largest average yield of roots per acre of the different varieties of swede turnips under test in connection with the Experimental Union. This variety is also one of the very highest yielders among those grown at the Agricultural College. The Hartley's Bronze Top, which comes second on the list in yield per acre, is a variety comparatively well and favorably known in Ontario.

Fall Turnips and Kohl Rabi. The Red Top White Globe is a very large yielding variety of fall turnips. It will be seen that it surpassed the White Egg variety by fully 7 tons per acre in 1905. It is one of the best yielding varieties of this class of roots which can be obtained. The Kohl Rabi, which is not grown in general cultivation throughout Ontario, is not popular among the experimenters and produced a comparatively low yield per acre. The Kohl Rabi is used either for table purposes or as a food for farm stock.

Field Carrots and Parsnips. The Mastadon White Intermediate carrot took the lead in yield of roots per acre throughout Ontario. This variety was distributed in 1905 for the first time, but it was expected that it would make a good record, as it had done so well in the trial grounds at Guelph. Although enquiries have been received regarding the productive qualities of parsnips in comparison with carrots and other roots for feeding purposes, we have found that even the best among some seven or eight varieties grown at the College does not make nearly as high a record over Ontario as the highest yielding variety of carrots.

Fodder Corn. The average results for the fodder corn appear strange when first examined. It will be seen that the Henderson's Eureka gave a total crop of 17½ tons and the White Cap Yellow Dent only about 11½ tons per acre; at the same time the White Cap Yellow Dent was a more popular fodder corn than the Henderson's Eureka, according to the reports of the experimenters. This seems to point to the fact that the people are realizing more and more that quality in fodder corn is an exceedingly important factor. The Henderson's Eureka is a very heavy producer of stalk and leaf, but is not as suitable for many parts of the Province as the White Cap Yellow Dent, which is an earlier variety and produces a large crop of ears. The Leaming produced about one and a half tons of total crop per acre more than the White Cap Yellow Dent, but was not as popular with the experimenters as the last named variety.

Millet. The Japanese Panicle millet has again made a good record. It will be seen that the yield of the green crop per acre of this variety is even ahead of that of some of the varieties of corn, which were grown, of course, on different farms. The Japanese Panicle gave an average of fully 4 tons of green crop per acre more than the Hungarian Grass, which is known so well throughout Ontario. The Japanese Panicle is a millet which has certainly made a fine record for itself both at the College and throughout Ontario within the past few years.

Grass Peas and Vetches. Grass peas, although not quite so popular as either of the two varieties of vetches under experiment, produced fully 2 tons per acre more than either of these varieties in 1905. As a rule, each of these crops is eaten quite readily by animals, although the common vetches may be slightly more appetizing than either the Grass peas or the Hairy vetches. Owing to the high price at which the Hairy vetch seed is sold, on account of its being largely imported from Germany, it is doubtful if this crop will be very generally grown throughout the Province.

Rape. The Dwarf Essex rape is the variety generally cultivated throughout Ontario. A few other varieties have been extensively advertised in the United States in recent years, namely, the Dwarf Bonanza, Dwarf Victoria, etc. It is difficult, however, to secure a variety of rape that will give better all-round satisfaction over a series of years than the Dwarf Essex variety.

Clovers. Three varieties of clovers, namely, Mammoth Red, Alsike, and Common, are distributed for co-operative experiments each year. The results for the first season are, of course, of but little value. It is difficult to place the average results of after years in tabulated form. In 1905 only two good reports were received of the yield of hay per acre produced from the first cutting in the season of each of these varieties. According to the average results, the Mammoth Red gave 3.9, the Common Red, 3.7, and the Alsike, 2.2 tons per acre. In the average results of ten experiments conducted previous to this year, there was a yield of hay from each of the clovers as follows: Mammoth Red, 3.8 tons; Alsike, 2.5 tons; and Common Red, 2.1 tons. It will be understood that the Common Red clover usually gives a second growth, and the Mammoth Red and Alsike produce but little each season after the first cutting is removed.

Perennial Crops. Seed of Lucerne, Sainfoin, and Burnet has been distributed for co-operative experiments during each of the last five years. As these are perennial crops, the results will accumulate as time advances. As the Lucerne usually furnishes three cuttings, and the Sainfoin and Burnet usually not more than one large and one small cutting in each year, it is rather difficult for the experimenters to cut the crops at the time when they are in the best condition for cutting and then to cure them in the very best way for the production of hay. As yet, we have the results of but few complete experiments. In the first cutting of the year, the Lucerne has given decidedly the best results each season in which the reports have been received. In fact, the average yield of hay from the Lucerne is more than double that of either the Sainfoin or the Burnet. We believe that the Lucerne will gradually be increased in those districts of Ontario where it can be grown successfully, as it is a very heavy yielder of fodder of excellent quality when properly cured. In the spring of 1904, Lucerne seed which had been inoculated with the proper bacteria and that which was not inoculated was distributed for experimental purposes. Only one good report of this test was received, and according to that report the inoculated seed produced 80 pounds of hay per acre more than the uninoculated seed.

Grasses. In the spring of 1905, seven different kinds of grasses were sent out for co-operative experiments, and we hope to receive good reports from these next season. Three of these varieties have been distributed for a sufficient length of time to enable us to obtain results therefrom. In the average of ten experiments, it has been found that the first cutting in the season has produced an average yield of hay per acre of 2.9 tons of Orchard Grass, 2.7 tons of Timothy, and 2.7 tons of Tall Oat Grass. In the results for 1905, the Orchard Grass gave the highest and the Tall Oat Grass the lowest yield per acre.

Autumn Sowing of Winter Rye and Hairy Vetches for Fodder Purposes. An interesting experiment has been carried on in each of the past three years by sowing Hairy Vetches and Winter Rye in the autumn for the purpose of producing green fodder in the following summer. The average results show that the yield of green crop per acre for 1905 and for the three-year period for the Hairy Vetches was 8.1 tons and 6 tons; and for the Winter Rye, 7.6 tons and 5.1 tons, respectively. The experimenters fed the crops to horses, cattle and pigs, and report that the Hairy Vetches were relished by all classes of stock. Some report that the Winter Rye was liked by horses and cattle, and others that it was not highly relished by any of the farm animals.

Autumn Sowing of Winter Barley and Winter Rye for Grain Production. Winter barley was distributed for experimental purposes in the autumn of 1904 for the first time. In the majority of cases, however, the crop did not survive the winter. Where the Winter Barley did not become winter-killed, it surpassed the Winter Rye in yield of both grain and straw and was very popular. The Mammoth variety of Winter Rye gave an average yield per acre of one ton of straw and 24 bushels of threshed grain. According to the experimenters, the rye looked somewhat unthrifty in the early spring, but grew splendidly as soon as the weather became sufficiently warm.

SWEET CORN, 1905.

Experiment.	Varieties.	Comparative value.	Table quality.	Comparative number of ears.	Number of days until ready for table use.
Sweet Corn (21 tests)..	Ringleader	100	90	96	84
	Mammoth White Cory	91	82	100	87
	Golden Bantam	82	100	82	88

Sweet Corn. There were twenty-one successfully conducted co-operative tests with sweet corn in 1905 as compared with eight in 1904. The results of the present year show that the varieties were ready for table use as follows: Ringleader, 84 days; Mammoth White Cory, 87 days; and Golden Bantam, 88 days. These are all comparatively early varieties. The reports show that the Mammoth Cory produced the greatest number of ears, that the Ringleader was popular with the experimenters, and that the Golden Bantam produced table corn of the best quality. The Golden Bantam is a specially valuable corn for table use. The ears are small and yellow in color when ready for use on the table. These two features probably had some influence in causing the experimenters to rate this variety a little lower than either of the other two varieties when everything was taken into consideration. The Golden Bantam, however, is not, as a rule, appreciated so much the first year it is grown as it is afterwards when its good qualities become more fully recognized. It is very juicy, exceedingly tender, and excellent in flavor. The experimenters placed it the highest of all three varieties both as regards juiciness and flavor.

METHODS OF PLANTING CORN, 1905.

Methods.	Yield per acre (tons).			
	Husked ears.		Whole crop.	
	1905, 4 tests.	Average 6 years, 33 tests.	1905, 6 tests.	Average 6 years, 38 tests.
Corn planted in squares or hills	2.73	2.75	7.97	11.00
Corn planted in rows or drills	2.40	2.47	7.97	10.16

Methods of Planting Corn. For six years in succession, an experiment has been conducted throughout Ontario in planting corn in squares, or hills, in comparison with planting corn in rows, or drills. The same amount of seed was used in both cases. The rows were three feet apart and the grains of corn nine inches apart in the rows, and the hills were three feet apart each way, having four kernels in each hill. Each plot was four rods square, thus containing sixteen square rods, or one-tenth of an acre. In each of the six years that the experiment has been conducted, the average results, both as regards yields of total crop and of ears per acre, have been somewhat in favor of planting in squares or hills, with the exception of 1905, when we notice that the total crop was exactly similar for the two methods of cultivation. The average results for the six years are in favor of the squares, or the hills. by about seven-eighths of a ton per acre, of which fully one-quarter of a ton was in the form of ears.

FERTILIZER EXPERIMENTS.

Oats, Mangels, Fodder Corn, and Swede Turnips.

Kind of fertilizer used.	Fertilizer per acre.	Average yield per acre.				
		Oats.	Mangels.	Fodder corn.		Swede Turnips, 4 years, 12 tests.
		5 years, 74 tests	5 years, 41 tests.	Whole crops, 7 years, 45 tests.	Husked ears, 7 years, 40 tests.	
	lbs.	bus.	tons.	tons.	tons.	tons.
Nothing	....	38.9	20.6	7.7	2.7	21.9
Nitrate of soda	160	46.3	26.5	9.0	3.1	24.1
Muriate of potash	160	43.8	24.6	9.2	3.0	24.9
Superphosphate	320	43.6	24.2	8.8	3.1	25.9
Complete fertilizer	213	48.7	25.4	9.0	3.2	27.2
Cow manure	40,000	....	....	....	....	30.1

Fertilizers. A considerable amount of valuable data is being obtained through experiments conducted with varieties of farm crops throughout Ontario. These experiments have now been under way during the past thirteen years. In each of the years, both the fertilizers and the seeds have been sent from the College to the experimenters. In every instance, the nitrate of soda and the muriate of potash have been applied at the rate of 160 pounds per acre and the superphosphate at the rate of 320 pounds per acre. The mixture, or complete fertilizer, has been composed of one-third of the amount of these fertilizers, making in all 213⅓ pounds. In all cases, the nitrate of soda has been applied when the plants were about three inches in height, and the muriate of potash and the superphosphate at the time of sowing the seed. The cost price for each of the fertilizers would be about $4.60 per acre. Farmyard manure has been used in the experiments of the past four years. The advice to each experimenter has been to apply 500 pounds of average cow manure per plot, the application being equal to twenty tons per acre. The cow manure has been mixed with the soil to a depth of from four to five inches, and the fertilizers have been stirred in the soil to a depth of from one to two inches.

In connection with the co-operative work, experiments have been conducted with fertilizers on oats for five years, on mangels for five years, on corn for seven years, and on swede turnips for four years. The results for 1905 are confined to the experiments with fertilizers on corn and swede turnips.

Fertilizers with Corn. In the average of the experiments in applying fertilizers with corn in each of seven years, during which time forty-five complete and satisfactory reports were received, it will be seen that the greatest yield of total crop was produced from the muriate of potash, and the greatest yield of husked ears from the complete fertilizer. An application of one hundred and sixty pounds of muriate of potash per acre increased the yield of corn 1.5 tons. This was accomplished at a cost of about $3.00 per ton for the fertilizer used.

Fertilizers with Swede Turnips. In 1905, in the average of six carefully conducted experiments with fertilizers and swede turnips, we learn that the yields of roots were as follows: Farmyard manure, 23.1 tons; mixed fertilizer, 21.1 tons; muriate of potash, 19.4 tons; superphosphate, 19.1 tons; nitrate of soda, 17.9 tons; and the unfertilized plot, 15.4 tons per acre. Of the different commercial fertilizers used, the mixed fertilizer, however, gave the largest yield per acre in 1905, and also in the average of the past four years. The average increase in the yield per acre from the land on which the complete fertilizer was used was 5.3 tons, or 175 bushels per acre. This increase was produced at a cost of about 2.6 cents per bushel.

Fertilizers with Mangels. During the five years in which fertilizers were used with mangels, forty-one good reports of successfully conducted experiments were received. These show that the smallest average yield was produced from the unfertilized plot, namely, 20.6 tons per acre, and that the largest average yield was produced from the nitrate of soda, namely, 26.5 tons per acre. As in the case with corn, the unfertilized land gave the lowest yield in each year. The nitrate of soda produced the highest yield in four out of the five years. The average of 197 bushels of mangels per acre produced by the nitrate of soda over the unfertilized land was obtained at a cost of about 2.3 cents per bushel. The nitrate of soda produced the largest yield on both heavy and light soils, but on the black loams the muriate of potash gave the highest yield of mangels. The nitrate of soda showed the greatest influence upon the light soils, as in the average of fifteen experiments, the land which was fertilized at the rate of one hundred and sixty pounds of nitrate of soda per acre gave an average yield of 7⅔ tons per acre more than the land which was unfertilized.

Fertilizers with Oats. Seventy-four good reports of successfully conducted experiments in applying fertilizers to oats were received during the five years in which this experiment was conducted over Ontario. The lowest yield was obtained from the unfertilized land, viz., 38.9 bushels per acre; and the highest average yield from the complete fertilizer, 48.7 bushels; and the nitrate of soda, 46.3 bushels per acre. The unfertilized land produced the lowest yield per acre in each of the five years. The mixed, or complete fertilizer, gave the largest yield of oats per acre in the average results of this experiment for each of the years in which it was conducted. Although the land which received the mixed fertilizer gave an average of 9.8 bushels of oats per acre more than the unfertilized land, still this increase was produced at a cost of about 47 cents per bushel. The mixed fertilizer gave a larger average yield than no fertilizer on heavy soils by 12.7 bushels per acre, on light soils by 10.2 bushels per acre, and on black mucky soils by 7.1 bushels per acre.

Fertilizers with Winter Wheat. For three years in succession, co-operative experiments have been conducted in applying fertilizers with winter wheat in the spring of the year. In 1905, as in the two years previous, the land which received cow manure produced the greatest yield per acre. Of the commercial fertilizers used in this experiment, the mixed fertilizer has produced the largest average yield, and the nitrate of soda the second highest yield of grain per acre. This experiment with winter wheat is being continued until a larger amount of data is obtained.

POTATO EXPERIMENTS, 1905.

Experiments.	Potatoes.	Comparative value.	Per cent rotten.	Per cent of small tubers.	Mealiness when cooked.	Bushels of whole crop per acre.
Late Varieties (93 tests)	Dempsey's Seedling...	100	7	9	91	177.1
	Empire State	78	7	10	100	160.3
	American Wonder....	76	8	8	97	159.4
Medium Varieties (70 tests)...............	Rose of the North	100	5	13	100	184.0
	Burpee's Extra Early..	99	5	12	98	170.7
Early Varieties (158 tests)...............	Early Fortune........	100	1	14	87	167.4
	Early Ohio...........	100	1	10	100	150.3
	Early Pinkeye........	85	0	16	74	141.2
	Stray Beauty	50	0	17	66	114.7
					Average yield in five years bus.	
Methods of Cultivation (33 tests)............	Grown in hills........	90	....	8	210.0	183.2
	Grown on the level....	100	....	10	206.2	181.1

Varieties of Potatoes. The table here presented reports the results of no less than three hundred and twenty-one successfully conducted experiments with varieties of potatoes in 1905. Of this number, one hundred and fifty-eight tests were with early, seventy tests with medium, and ninety-three tests with late potatoes. In all, nine different kinds were distributed in the spring of 1905. Only two varieties were sent to each experimenter, but as the Empire State was sent in every lot of late potatoes, and the Early Pinkeye in every lot of early potatoes, a basis was formed by which the yields of the other varieties could be placed in one comparative table, which is here presented. In the average of three years' experiments at the College, the number of days from the time of planting until the potatoes of each of the varieties here referred to were ripe was as follows: Early Pinkeye, 89; Stray Beauty, 91; Early Ohio and Early Fortune, each 92; Rose of the North, 103, Burpee's Extra Early, 104; Dempsey's Seedling and American Wonder, each 107, and Empire State, 109. The average results of the ninety-three tests of late potatoes show the Dempsey's Seedling to give the greatest yield per acre and to be the most popular variety among the experimenters. The Empire State was the most mealy when cooked, but possessed slightly more small potatoes than either the American Wonder or the Dempsey's Seedling. The American Wonder came lowest in yield per acre and in popularity, and contained slightly more rotten potatoes than either of the other two varieties. Of the two kinds of medium potatoes, the Rose of the North was the more popular, produced a greater yield per acre, and furnished potatoes which were slightly more mealy than those of the Burpee's Extra Early variety. In all, four varieties of early potatoes were distributed, namely, the Early Fortune, Early Ohio, Early Pinkeye, and Stray Beauty. Of these the Early Fortune gave the highest and the Stray Beauty decidedly the lowest yield per acre. The Early Fortune and the Early Ohio were equal in popularity, but the last named variety possessed potatoes which were rather more mealy than those of the Early Fortune variety. Both the Stray Beauty and the Early Pinkeye gave a much larger percentage of small potatoes than did the Early Ohio. It is interesting to note that in regard to rot, the early varieties had the smallest, the medium-ripening varieties the medium, and the late-ripening varieties the greatest percentage. In the results for last year, the late varieties also had the greatest amount of rot, but the medium kinds were not as subject to rot as those which matured at an earlier date. According to the results of the past year, the Dempsey's Seedling among the late, the Rose of the North among the medium, and the Early Fortune among the Early varieties of potatoes, made excellent records.

Methods of Cultivating Potatoes. For five years in succession, potatoes have been distributed throughout Ontario and instructions given for carrying on a careful experiment in comparing the practice of "hilling up" potatoes as against growing them on the level. The results for 1903, 1904, and 1905 are in favor of hilling up potatoes, probably due to the cool, damp seasons of the past three years. In each of the two years previous, the results were in favor of level cultivation. Taking the average of the five years, during which time one hundred and seventy successfully conducted experiments have been reported, we find that the potatoes which were hilled up gave 210 bushels, and those which were grown on the level gave 206.2 bushels per acre, or about 4 bushels per acre in favor of those grown in hills. The results at the Agricultural College have been very similar to these, being in favor of hilled cultivation during the last three or four years, and in favor of the level planting for the time previous.

Q. We tried the Joanette variety of oats in our part of the country some time ago and declared it a failure. We have found since that we sowed it too thickly, as we used two bushels to the acre.

Prof. Zavitz: It is the greatest stooling oat we have and it must be sown thinly on that account.

Q. What is the feeding value of Emmer?

A. The grain is about equal to barley for feeding purposes. In the past four years in Ontario, Emmer has gone a little ahead of the best varieties of barley and oats in yield of grain per acre. We find that at Guelph it is giving a little larger yield of grain per acre than either barley or oats. It has a beautiful bright straw of good quality, but it is a trifle weak, being not much stronger than barley.

Q. Are you going to encourage its growth?

A. My opinion is that it is worthy of more extended cultivation in many localities. As the result of the co-operative tests, it will likely be experimented with on a larger scale. If the results continue to be favorable, it will soon spread over the Province.

Q. What kind of soil does it require?

A. It will thrive on a somewhat poorer soil than barley. It might also prove valuable on soils that produce too much straw when other crops are grown.

Mr. Fraser: I cannot say that I like it quite as well as barley.

A Member: We grew it last year and obtained a yield of seventy bushels to the acre.

Hon. John Dryden: I should like to know definitely what its value is for feeding purposes, because if my friend can grow seventy bushels per acre and it is of greater feeding value than barley, I should like to change.

Prof. Zavitz: We have not conducted any experiments to ascertain its feeding value here at the College, but several stations in the United States have done so, and their conclusion is that Emmer and barley are about equal in value for feeding purposes.

Q. What results are obtained in mixing Emmer with oats as a ration for milch cows? We found nothing to equal it for that purpose.

Prof. Zavitz: It should do well when mixed with barley and oats and ground for milch cows. I would not advise any of you to go into it extensively at first, but to conduct experiments on your own farms. You might get some of it next year, if you wish, in connection with our Experimental Union. Then you will find out for yourselves how suitable it is for your own conditions.

Q. Is Emmer satisfactory when sown with oats?

A. Not as a rule. We find it will not stand crowding nearly so well as some other grains. If a mixture is required, barley when mixed with oats will form a much larger proportion of the crop than is formed by Emmer when mixed with oats. I know of some people who have been growing Emmer with oats successfully; and of others who find it unsuccessful for using in mixtures. Our own results are rather against it.

Q. What does it weigh per bushel?

A. The seedsmen usually take 40 pounds as the standard bushel.

Q. In growing grains in combination, do you mix the grain before sowing, or is each sown separately?

A. They are usually mixed before sowing.

Q. Have you experimented with a view of trying to improve corn silage by mixing it with a crop of beans?

A. I presume you refer to growing corn and horse beans together. We find that the horse bean one year with another is not a success. We have tried the Medium Green Soy bean, grown by itself, and have formed a very good opinion of it for this purpose. I have received some very favorable reports on the Soy bean when mixed with corn in the silo.

Q. One of the Experiment Stations on the other side recommend the Cow pea in preference.

A. I do not think we can do much with the Cow pea in Ontario. It requires a long season for growth. It is all right for the Southern States. We have tested many varieties within the past twelve or fifteen years. None have given very satisfactory results.

Q. Have you tried it in the southern portion of the Province?

A. We have sent it out occasionally to our experimenters. Mr. Erland Lee, of Stony Creek, had very good success on one or two occasions, but I do not know whether this success has been continuous. The year he had good results, we had comparatively good results here.

Prof. Stone: I should like to put in a word in this connection in favor of the Soy bean. We have not had first class success with it at our Station, but some of the farmers, whose soil is better adapted to it, have had excellent results. I have a letter from a farmer who expresses himself very enthusiastically on this subject. By using the Soy bean and corn for silage, he had been able to cut out the grain ration in winter feeding and his cattle came out in better shape in the spring. He also states that his cows never held their flow of milk so well. Soil inoculation has an important bearing on the success of this crop and many of our farmers have had indifferent results on that account.

Q. With reference to mixtures, does not Goose wheat add to the feeding value, even if the quantity is reduced?

Prof. ZAVITZ: I suppose the quality would be slightly increased, but the reduction in yield from the introduction of the wheat is considerable.

Q. Do you sow the grain with a grain drill or broadcast?

A. In our experiments here, we sow it broadcast. We find from previous tests, however, that we get about three-quarters of a bushel more per acre by drilling in the seed.

Q. Do you not think you should have better results by sowing half one way and then crossing and sowing the other half the other way.

A. We have tried that method with different varieties of winter wheat, but it has not increased the yield.

Q. Have you had any difficulty with the aphis on swede turnips? The crop was almost destroyed in the Burlington district last fall.

Prof. ZAVITZ: I do not know of any economical method of treating this pest on turnips or rape when these are grown in large fields. If you will watch the start of the pest and destroy the few plants where aphis begins to work, you can often check it in that way. Late sown roots are less apt to be affected.

Q. At what time do you sow?

A. We usually sow our turnips about the 20th of June and get a good crop. We generally avoid the aphis, although it troubled us this year, as it was exceptionally bad during the past season.

A MEMBER: We sow about the 1st of July and have no trouble, but, of course, the turnips do not grow as large.

Hon. JOHN DRYDEN: I suppose if you were to postpone the date of sowing much later, you would have neither turnips nor aphis.

Q. Is the quality of the turnip less for feeding purposes on account of this pest?

Prof. ZAVITZ: It would tend to stunt the plant and decrease the yield.

Mr. DRYDEN: One of the worst results, so far as I know, is that, if badly attacked, the turnips become hollow in the crown and afterwards decay inside.

Q. Which of the three varieties of fodder corn matures earliest?

A. The White Cap Yellow Dent matures earlier than either the Leaming or the Henderson's Eureka. We find, as a rule, that the large varieties mature later than the smaller varieties.

Q. Are there not several strains of Leaming?

A. Yes, a number of them. When you obtain a strain that is successful on your farm, it is best to continue to get your seed from the same source.

Q. Do you use deep or shallow cultivation in your corn experiments?

Prof. ZAVITZ: We leave that to the discretion of the experimenter. At the College, we have tried four methods, namely, deep cultivation all through the season, shallow cultivation all through the season, shallow cultivation at first, gradually getting deeper, and deep cultivation at first and gradually getting more shallow. The experiments of four years have demonstrated that the best results were obtained by cultivating deep at first and gradually getting more shallow as the season advanced.

Q. Is the season long enough here for maturing the seed of the Hairy vetch?

Prof. ZAVITZ: If sown about the end of August, the plant will grow to be three or four inches in height before winter sets in. The plant nearly always winters well, and will produce seed the following summer. Twice as much seed will be obtained from autumn as compared with spring sowing. At the College, an average yield of about seven bushels per acre has been obtained for the past five years. In other parts of the Province, while good results were obtained in some seasons, they were poor in others. In dry seasons, the crop does not give a good yield of seed.

Prof. HUTT: We have found the Hairy vetch one of the best cover crops for an orchard, for which purpose it is sown about the middle of July. It also gives good results when sown after the removal of the strawberry plantation. If seed could be obtained for about $2 instead of $5, it would be more widely grown.

Q. How much do you sow per acre?

Prof. ZAVITZ: We generally sow one bushel of Hairy vetch seed per acre when growing the crop in the field. Sometimes a bushel and a half is recommended. The amount of seed used depends upon the use which is to be made of the crop, whether for pasture, fodder, green manure, a cover crop, or for the production of seed.

Prof. HUTT: For the purpose of a cover crop, we sow only thirty pounds to the acre. One of the reasons the seed is so expensive is because it shells so badly that it is difficult to get a good crop.

Prof. ZAVITZ: The crop ripens very unevenly, blossoms often appearing when some of the seed is ripening.

W. S. FRASER: Hot, dry weather in summer is particularly injurious to it. It might produce seed better in sections that are cooler and where the humidity is greater.

Q. Does the common vetch winter like the Hairy vetch?

Prof. ZAVITZ: The common vetch is a spring crop and will not winter successfully.

Q. What is the comparative growth of the Hairy and common vetch when sown in the spring?

A. When both are sown in the spring, the growth of the Hairy vetch is usually about one-half as much again as that of the common variety.

Q. Do you sow in drills for cover crop purposes?

Prof. HUTT: Not in the orchard. If it is sown after July, it will not spread to any extent.

Prof. ZAVITZ: Some fifty varieties of sweet corn have been under test at the College, and as a table corn for home consumption, the Yellow Bantam was unsurpassed, if equalled. I doubt if it will take well on the market, because of the yellow color of the grain and of the smallness of the ears and could not be recommended to the market gardener on that account. This was an instance where the consumer needed education. It is certainly a grand variety of sweet corn for table use.

GEO. A. ROBERTSON, St. Catharines: The Vermont Gold Coin variety of potatoes has been one of the best varieties in the Niagara district.

Prof. ZAVITZ: We have had the Vermont Gold Coin at the College for two years. It is a late potato which has done fairly well, but not equal to the Empire State, Dempsey's Seedling, or American Wonder in yield per acre. The Vermont Gold Coin had 40 per cent. of rot in 1904 and 10 per cent. of rot in 1905.

Prof. Stone, Cornell University: The Gold Coin variety has done well in New York State. I assume, that while certain varieties of potatoes came first in the average of experiments, other varieties held first place in the reports of individual experimenters. One variety would suit one man's soil and conditions much better than another, and that was the variety for him to grow, although it might not be the one that averaged best of all over the Province.

Prof. Zavitz: That emphasizes the great value of our co-operative work to the individual experimenter. One of the best results of our work is the fact that 4,000 experimenters, located in different parts of the Province, are thus enabled to see just what is best suited to their own particular soils and localities. At the same time, a statement showing average results under average conditions all over Ontario is of very great value as a general guide.

In answer to a question, Prof. Zavitz said that the average of five years' experiments showed a better yield by 14 bushels per acre from potatoes planted on the same day the seed was cut than from seed cut four, five, or six days before planting.

Q. How do you apply fertilizers to root crops?

A. Muriate of potash and superphosphates are applied before planting the seed. Nitrate of soda, being very soluble, gives better results if applied when the plants are about two inches in height, as it is immediately available and greatly stimulates the growth of the young plants. If applied too soon, much of its value would be lost through leaching.

Q. Do you find that nitrate of soda retards ripening?

A. It has a tendency to do so. It induces a very luxuriant growth in the stems and the leaves of the plant and has a tendency to prolong the growth and retard the ripening stage.

Major Sheppard: We do not grow much wheat in the Niagara district, but our practice is to drill in the fertilizer with the seed. This plan gives us good results in an increased yield of straw and we also obtain a better catch of clover in this way.

G. F. Marsh: I would certainly drill in mixed fertilizer when fertilizing a fall sown crop.

Prof. Stone: The practice with our farmers is to apply a moderate amount of fertilizer at the time of seeding the grain crop in the fall. This starts a vigorous growth which carries the plant through the winter in good shape, and gives it a good start in the spring. When spring comes, if certain portions of the field are observed to have suffered, we find it advisable to apply nitrate of soda to these spots. Nitrate of soda applied to grain crops, after they have been weakened by the winter, is almost magical in its results. It is certainly not profitable as a rule to apply large amounts of commercial fertilizer to grain crops, but a moderate application, in order to give the plant a send-off, is sometimes of great advantage. A poor start is very detrimental to later growth and development.

Prof. Zavitz: I think it is agreed that the greatest returns from the use of fertilizers are to be obtained in connection with crops that have a high value per acre, such as sugar beets and the garden crops.

G. F. Marsh: The employment of leguminous crops to increase the supply of nitrogen in the soil is a more economical method than to use nitrates.

Prof. Zavitz: The value of liquid manure for this purpose is also too often overlooked. It is frequently allowed to leach away and just that much fertility is lost to the soil. Straw, or other absorbents, should be used with care and the manure should be placed on the land before the soluble part has been leached out or before the ammonia has escaped by the manure becoming too hot and dry. The care of the manure and its proper application, as well as a systematic and economical use of clover, are some of the indirect lessons which are impressed upon us through the co-operative experiments with fertilizers on farm crops.

RESULTS OF CO-OPERATIVE EXPERIMENTS WITH FERTILIZERS ON SWAMP SOILS.

Prof. R. Harcourt, Agricultural College, Guelph.

Repeated analyses of swamp soils, wherever they occur, show that they contain a very large quantity of nitrogen and small amounts of potash and phosphoric acid. Occasionally there may be found mixed with these soils a quantity of marly substances containing a number of small shells. In such instances there may be a fair, or even a comparatively large amount of phosphoric acid. Usually, unless they are of this latter type, they will also be deficient in lime, and may even be sour or acid because they do not contain enough mineral matter to neutralize the acid formed in the decomposition of the organic matter. In fact, swamp soils are generally lacking in mineral matter, and are almost entirely composed of vegetable matter in various stages of decomposition. Under proper conditions for nitrification the nitrogen in this organic matter is rapidly brought into an available form and in such quantities as to entirely overbalance the mineral part of the plant food. The result is that the growth on such soils is rank and weak with a poor development of grain, or it is small and yellow in color, due to an extremely small amount of mineral substances and consequent acidity of the soil. This latter condition will check nitrification and thus a plant may be stunted in growth for want of nitrogen, although surrounded by an immense amount of it in a partially decomposed form. So far as the acidity itself is concerned, it may be easily and comparatively inexpensively remedied by the application of lime, but the lack of potash and phosphoric acid is a much more serious matter.

Last spring we secured the co-operation of a number of farmers in testing the effect of fertilizers on swamp soils. Eleven of these consented to undertake experiments with the oat crop and seven on the corn crop. For the first season, it was decided to make the work as simple as possible and only three plots were used in each experiment. These consisted of (1) no fertilizer, (2) muriate of potash, and (3) muriate of potash and Thomas phosphate combined. On account of the difficulty in getting the grain threshed, the plots in the oat experiment were only two square rods, or one-eightieth of an acre, in size, but the corn plots each consisted of one-tenth of an acre. In both cases the muriate of potash was applied at the rate of 200 pounds per acre and the Thomas phosphate at 400 pounds per acre. Owing to the wet weather in the early part of the season many of the plots on these low lying lands were destroyed and only four experimenters with the oat crop and four with the corn crop were able to send in full returns. These results will be found in the following table.

EFFECT OF FERTILIZERS ON SWAMP SOILS WITH OATS AND CORN.

		Experiments.	Oats.	Corn.
			Bushels per acre.	Weight of corn on cob per acre.
I.	Plot 1.	No fertilizer	40.0	46.50
	" 2.	Muriate of potash, 200 lbs. per acre	65.9	51.40
	" 3.	Muriate of potash, 200 lbs Thomas' phosphate, 400 lbs. per acre	54.1	49.00
II.	Plot 1.	No fertilizer	34.1	24.00
	" 2.	Muriate of potash, 200 lbs	47.0	27.30
	" 3.	Muriate of potash, 200 lbs. Thomas' phosphate, 400 lbs. per acre	44.7	37.90
III.	Plot 1.	No fertilizer	23.5	21.60
	" 2.	Muriate of potash, 200 lbs.	30.6	27.80
	" 3.	Muriate of potash, 200 lbs. Thomas' phosphate, 400 lbs. per acre	40.0	33.20
IV.	Plot 1.	No fertilizer	16.3	14.00
	" 2.	Muriate of potash, 200 lbs	21.8	27.80
	" 3.	Muriate of potash, 200 lbs. Thomas' phosphate, 400 lbs.	37.6	29.20

An examination of the above table shows that in every case the potash caused an increase in the yield of grain. With the oats, this increase amounted to from 30 to 40 per cent. and with the corn crop from 10 to nearly 100 per cent. over the no fertilizer plot. In two experiments with the oat crop and one with the corn crop the Thomas phosphate gave no further increase in the yield. On the remaining plots the Thomas phosphate caused an increase of 30 and 77 per cent. with the oat crop, and 39, 19, and 5 per cent. with the corn crop over the potash alone.

The experimenters using the oat crop reported that on the "no fertilizer" plot the straw was so weak that it broke down early and produced light grain, while the fertilized plots produced long, bright straw which stood up well and yielded grain of good quality. On the corn plots, the difference was not so much in the appearance of stalks as in the size of the cobs and the quality of the corn. The fertilizer plots, and especially those having the phosphate, produced large, well ripened ears of corn, while the "no fertilizer" plot yielded a large percentage of small, poorly developed cobs.

It is quite possible that the phosphate would have given better results on the oats had it been applied earlier; but was not thought advisable to use superphosphate on these soils which are naturally inclined to be acid. Thomas phosphate, on the other hand, contains a considerable quantity of lime, but the phosphoric acid does not come into solution very readily and should be applied sometime before the crop is sown and thoroughly incorporated with the ground. This was not possible in these experiments. In fact in some cases it was applied as a top dressing after the oats were sown. With a crop having a short period of growth, like the oats, it is very probable that only a small amount of the phosphate came into solution in time to be of use and that it will have even greater influence on the succeeding crop.

With regard to the question as to whether the increase in the crop was sufficient to leave a profit after paying for the fertilizer, it may be stated that even with the high price of fertilizers this past season, and not taking into consideration the difference in the quality of the grain, several plots gave sufficient increase in the yield to leave a good profit. It is, however, manifestly unfair to charge the whole price of the fertilizers of the nature used against the first crop. Neither the potash nor the phosphoric acid will be lost by leaching to any appreciable extent and, consequently, the portion of them remaining will be available for future crops. To bring out the full returns the yield of the crop grown on these plots the next two or three seasons should be obtained. If possible this will be secured and the results brought before a later meeting of the Union.

In conclusion, it may be pointed out that the results show that these soils are in need of mineral constituents, and that many of them lie over a clay subsoil. As clays contain the constituents lacking in the swamp soil, an effort should be made to get the clay up and mixed with the top soil. Experience has demonstrated that where a subsoil of this nature may be reached by the plow or when it is situated at such a depth that it may be dug up and mixed with vegetable matter on the surface, good results may be secured. If, however, the muck is too deep for this treatment to be profitable, it will probably be necessary to apply mineral matter until the top vegetable layer has settled sufficiently to allow of the incorporation of the subsoil. If, on the other hand, the subsoil is sandy, it may have to be continually supplied with a certain amount of mineral substance.

T. H. Mason: What is the influence of commercial fertilizers on the clover catch?

Prof. Harcourt: The subject of commercial fertilizers is a somewhat difficult one to understand, but there are certain principles underlying their use, which must be clearly borne in mind, if profit is to result from them. Briefly stated these principles are as follows: Nitrogen promotes leaf and stem growth, phosphoric acid promotes the development of the plant and hastens maturity; this has been very marked in connection with corn experiments. We should know first what our soil is deficient in; second, the requirements of the crop and the objects in view in growing that crop. If, for instance, you desire to secure early tomatoes, nitrate of soda should not be used; or if it is used, it should be in small quantities and superphosphates should be applied in addition. Commercial fertilizers must be used intelligently and as adjuncts to barnyard manure, which will improve the mechanical condition of the soil so that commercial fertilizers may be employed to better advantage.

As to their effect on the catch of clover seed, anything that is nitrogenous in its nature and will give a ready amount of available nitrogen, will help to start quick growth. This is what is wanted with clover. The plant starts its growth on the limited amount of plant food stored in the seed. It exhausts this in throwing out its rootlets and then has to subsist on what these rootlets can obtain from the soil. This is the critical period in the growth of the plant. If a supply is not readily available, the plant is apt to become stunted, and if adverse conditions follow, failure to catch is the result.

RESULTS OF CO-OPERATIVE EXPERIMENTS IN FRUIT GROWING.

By Prof. H. L. Hutt, O.A.C., Guelph.

The co-operative testing of small fruits was begun in a small way twelve years ago with sixty experimenters. Each year since then the work has grown steadily, and this year plants were sent to 532 experimenters. During this time we have sent out material for 3,183 experiments. This has been distributed among about 2,000 experimenters scattered in all parts of the country. These tests are now being conducted in every county and district in the Province, and a pleasing feature of the work is that they are being most eagerly taken up by the settlers in the newer and northern sections of the country, where the greatest encouragement to amateur fruit growing is needed.

In some particulars this co-operative experimenting in fruit growing is different from that in grain growing, and in many ways there are more difficulties to be overcome. In the first place there is more danger of failure through loss of the plants in shipment and planting. Many of the experimenters have had little or no previous experience in growing fruit. Then the results are not concluded at the end of the first season, for that is only the beginning of the work, and some who make a good beginning are unable to carry it on through several years to a satisfactory conclusion. But notwithstanding all these difficulties, we are pleased with the progress that has been made and with more funds for carrying it on we hope to make much greater progress in the future.

The following is the list of experiments offered to experimenters last spring:

I. Strawberries: Splendid, Clyde, Tennessee, and Irene, 12 plants of each.

II. Raspberries: Marlboro', Cuthbert, Golden Queen and Columbian, 6 plants of each.

III. Black Raspberries: Gregg, Kansas, Palmer, and Older, 6 plants of each.

IV. Blackberries: Agawam, Gainor, Kittatinny, and Snyder, 6 plants of each.

V. Currants: Fay, Raby Castle, Victoria, and White Grape, 2 plants of each.

VI. Black Currants: Champion, Lees, Naples, and Black Victoria, 2 plants of each.

VII. Gooseberries: Downing, Pearl, Red Jacket, and Whitesmith, 2 plants of each.

This list includes all of the types of small fruits usually cultivated in this country, and the varieties mentioned are those which have been found by years of testing here and at some of the Ontario Fruit Experiment Stations to be the best for a general home collection.

The Strawberry Experiment.

Some idea of the popularity of the strawberry as a fruit for the farmers and amateur fruit grower's garden may be learned from the fact that there is usually four times the demand for this fruit as for any other on our list. During the past twelve years we have distributed 1,171 lots for experiment—in all a little over 56,200 plants.

Strawberries may be classed among our hardiest fruits, for they may be grown as far north as any of the fruits can be grown. In fact, they often do better in northern sections where the snow covers them all winter, than they do in some of the southern sections where they have less snow in the winter to protect them. It is in those sections where there is least snow that there is the greatest necessity for putting on a winter covering of strawy manure, or some such material, to protect the plants from the injurious effects of alternate freezing and thawing.

On the other hand, strawberries loose their vitality when out of the ground much sooner than any of the bush fruits. And for this reason there is a greater danger of loss of the plants in shipment, particularly if they are delayed anywhere in the mails. The majority of our experimenters report fairly good results with their planting last spring with all the varieties sent except the Splendid. The reason of the failure with this variety was that the plants had to be obtained from a place 70 or 80 miles away from where the others were grown and packed, and their vitality was weakened by being several days longer out of the ground. The effect of this was observed by over 200 of the experimenters who got these plants last spring, and it emphasizes the importance of growers growing their own plants or getting them near home, where they will be out of the ground as little as possible. Many of the experimenters had a full stand of plants with all the other varieties, but those who succeeded in getting even half of them to live will soon be able from them to have a good stock of plants of their own growing, with which there need be little or no loss in planting.

From the plants sent out this year no crop was expected, but 35 experimenters report upon the plants sent out last year. The varieties giving the heaviest yields were Tennessee Prolific and Clyde, both of which are good midseason varieties. Irene ranks third and Van Deman fourth. The former is one of the best late varieties, and the latter a choice, very early variety. Both of them are worthy of a place in a home collection to extend the season from the earliest to the latest.

THE RASPBERRY EXPERIMENT.

The varieties distributed for this experiment were: Marlboro', Cuthbert, Golden Queen, and Columbian. All of these are desirable in any home collection. Marlboro is one of the best early reds and Cuthbert one of the best late reds; Golden Queen is one of the best yellows, and Columbian the best purple variety. Fifty experimenters reported upon the results of last spring's planting, and 48 report upon the plants sent out previous to last year. On the whole, Cuthbert and Columbian have been the most productive. One grower remarks that "Cuthbert knocks them all out, either for home use or market." Others speak very highly of Columbian, and one experimenter says he likes the Golden Queen best of all and is propagating it as fast as he can. In this way all can have their choice, and increase those they like best. Herein, again, the work adapts itself to the likes and dislikes of all.

THE BLACK RASPBERRY EXPERIMENT.

The varieties sent out for this experiment were: Gregg, Kansas, Palmer, and Older. Most of the experimenters report very favorably upon the results of their planting last spring. These black caps have stood the shipping and transplanting much better than those in the previous experiment.

Fifty-one of those who received plants previous to this year have reported this year on the crop. Gregg and Kansas have been the most productive.

The black raspberry is not quite so hardy as the red, and many of our experimenters in the northern sections of the country report that the bushes have been more or less badly winter killed. The Older, which we were able to send out this year for the first time, has always been one of our hardiest blackcaps, often coming through the winter uninjured, while other varieties were killed back to the snow line. We are hoping this variety will prove of value where the others are too tender.

The Blackberry Experiment.

Blackberry roots usually retain their vitality well in shipment, and most of the experimenters report that they have been successful in getting all of the plants to grow. This, fruit, however, is the most tender of all our bush fruits, and many of the experimenters report that although the canes made a vigorous growth of several feet, in nearly all except the southern sections of the Province the canes killed back in the winter, and consequently bore little or no fruit. Of the four varieties sent out,—Agawam, Gainor, Kittatinny, and Snyder,—the Agawam has proved by far the hardiest. This variety has done remarkably well with Mr. G. C. Caston, 12 miles north-west of Barrie.

The Red and White Currant Experiment.

The currant is one of the hardiest of the bush fruits and the plants stand shipment and transplanting well. Most of the experimenters report that all of the plants have lived and made good growth. Ninety-five reports have been received from those who have been conducting this experiment. The varieties under test rank in the following order for productiveness: Victoria, Raby Castle, White Grape, and Fay. Fay is the largest fruited one of the lot and White Grape is the best of the white currants.

The Black Currant Experiment.

Black currants as well as the red and white varieties are extremely hardy and stand transplanting well. The majority of the experimenters report good results in their planting. The plants for this experiment have only been sent out during the past three years, and those first sent out began fruiting this year. The varieties included in the test are: Champion, Lees, Naples and Black Victoria. The results so far show comparatively little difference. The Black Victoria is apparently the earliest to begin fruiting.

The Gooseberry Experiment.

Gooseberries rank among the hardy fruits, and like the currant can be grown successfully much farther north than raspberries or blackberries. The plants retain their vitality well in shipping, consequently most of our experimenters report good results with their planting. The varieties sent out for this experiment were: Downing, Pearl, Red Jacket, and Whitesmith. Fifty-five lots were sent out last spring, and in all 366 lots have been distributed during the past ten years. One hundred and ten experimenters have reported this fall, and, with a few exceptions, all report Pearl as the most productive; Downing ranks second, and Red Jacket and Whitesmith in the order named. The Whitesmith is one of the best of the English varieties, but in many places it is subject to mildew, and is not so productive as many of the other varieties, although it bears larger, finer fruits.

The foregoing is a brief summary of the results of the experiments which have been conducted so far. In conclusion I may repeat what I have said on former occasions, that the chief value in this work is not so much in the summary presented at this meeting, although that may be interesting to those interested in frut-growing. The greatest value, however, accrues to the individual experimenters who carefully conduct the experiment and take good care of their plants. Many are thus given a start with a few of the best varieties, which they can propagate for themselves and increase their stock as much as they desire.

Arrangements have been made for extending the work considerably during the coming year, and we hope to have a larger grant for the purchase of stock, and intend to distribute much more widely than we have done in the past. Arrangements have also been made for adding to the list of experiments a test of a few of the leading varieties of grapes most likely to succeed in the northern sections and also a few of the best varieties for southern sections of the Province. Apples, too, have been added to the list. We propose to make use of the results of the Ontario Fruit Experiment Stations and to distribute to the northern counties of the Province one-half dozen of the best varieties of apples most likely to succeed in those sections, and also one-half dozen of the choicest varieties for the southern portions of the Province. In this way we hope to broaden the work of the Experimental Union and encourage the growing of the best varieties in sections where they have probably never been tried before.

P. W. HODGETTS: I wish to add a few words in support of what Prof. Hutt has said. The Ontario Fruit Experiment Stations have, after practically ten years' work, now prepared lists of varieties of fruits suitable for the different districts of the Province in which they are situated. These results it is now our duty to place in the hands of the farmer and fruit grower, and I know of no better medium than the Experimental Union, and no better method than the placing of these recommended varieties, either as buds, grafts, or trees, in the hands of the members of the Union.

As conditions differ so much in the various sections of the Province, and even in the different townships of some counties, the further information that we will receive from these reports will be of great value to the fruit growers in their further planting, or in the renewing of their present orchards by grafting.

Before the starting of the present fruit stations, this work was carried on, under considerable difficulty, by the Fruit Growers' Association. Many important commercial varieties were distributed throughout Ontario, including the Wealthy, McIntosh, Ontario and Transparent apples; the Glass Seedling plum; the Clapps', Flemish, and Boussock pears; the Niagara, Moore's Early, Diamond, Salem, and Vergennes grapes. This work was fairly successful and many good reports were received. The object sought after was to make an experimental garden of the whole Province, and each member was expected every year to report whether the tree proved to be hardy, productive, free from disease, and the fruit good or poor in quality, its time of ripening, usefulness and profitableness.

Owing to a lack of effort on the part of the Association in following up this work by the sending out of blank reports, many of the experimenters were lost sight of and the value of the work decreased. The failure of these reports to materialize finally caused the discontinuance of the distribution of trees. This evil would overcome in the case of the Union, as its follow-up system for reports is so thorough. I believe the extra expense incurred by this new departure would in a few years be well repaid by the valuable information obtained.

In discussing Prof. Hutt's report, Major Sheppard, of Queenston, suggested that it would be well to send out scions as well as trees, as those who had bearing trees could obtain results more quickly in this way.

Prof. Hutt: Our intention is to distribute one year old trees, as they will have to be sent by mail. Such trees will be particularly valuable in the northern parts of the Province, as they can be headed low and thus made less liable to sun-scald. The ordinary nursery stock headed four and a half and five feet from the ground is unsuited to northern districts on this account. The general tendency to-day is towards lower headed trees, as they are more advantageous in every way, except as regards cultivation, and this difficulty may be overcome by using extension cultivators. With regard to scions, the thought is that, after the trees sent have attained a year's growth, scions could be taken from them and grafted on bearing trees.

Q. Will a scion taken from a bearing tree and grafted on a bearing tree produce fruit sooner than one cut from a tree that is not bearing?

Prof. Hutt: I do not think so, but, of course, a scion grafted on a bearing tree would produce quicker than if grafted on a tree that is not of bearing age.

Q. At what season do you cut your scions?

Prof. Hutt: If you are in a section where the wood is liable to be injured by the winter, they should be cut in the fall and stored in sand in the cellar for use in the spring. The best plan, where it can be adopted, is to cut the scions sometime in March, or April, say a week or ten days before grafting.

Q. Do you propose sending out new varieties?

A. No; only varieties that have been tested here and at the Fruit Experimental Stations and found to be among the best.

Q. Have there been any experiments carried on with the cultivation of the cranberry, and, if so, with what results? We are paying out an immense amount of money for cranberries when they might be grown in Ontario with great profit. I spent several days in the midst of the industry in Wisconsin. I was amazed to find that there fifty barrels have been realized per acre. There is no fruit more easily cultivated, if the work is done scientifically.

Prof. Hutt: No experiments have been conducted with cranberries. It is a fruit that has been neglected in this Province so far as cultivation is concerned. The same is true of the blueberry. In many portions of Northern Ontario the cranberry could be cultivated most profitably.

A Member: Great attention has been given them in the Eastern States and in Wisconsin, and many distinct varieties of the fruit are recognized.

Mr. G. Robertson: Why is Concord left out of the list of grapes which you propose sending to experimenters?

A. Wilder and Concord are very much alike, but it might be well to put Concord on the list for Southern Ontario.

Q. Why is Moor's Early omitted from the Northern list?

A. I think Champion will give better results as an early grape for the Northern sections of the Province.

Mr. G. Robertson: I think Concord is the most profitable grape grown. Worden bears a little earlier but it is more liable to rot and there are too many small green grapes in the bunch. Brighton also fails to set its fruit well in some seasons. It mildews easily, is not a good bearing grape, and the fruit becomes very dark in color on maturity.

Prof. Hutt: Brighton is one of the standards for quality. It has some of the objections mentioned, but it is certainly a valuable grape. Imperfect fruit is often due to imperfect pollenization and is observed chiefly in large plantations of one variety.

Major Sheppard: I find Worden an excellent variety, much superior in quality to Concord. It is hardier with us, and a more uniform bearer. My land is very heavy, which may have something to do with it. I have no trouble with small green grapes in the bunch.

Q. Is there any way of stopping the ravages of the rose chaffer? It destroys the blossom of the grape in some sections.

Prof. Hutt: This pest has been very troublesome, especially on sandy soils and is a difficult one to contend with. The vine should be sprayed heavily with Paris green to poison the insects; or if you will shake the vine in the early morning, while the insect is sluggish, it will drop to the ground and may be collected in sheets and destroyed. Sumach is sometimes used as a decoy plant.

RESULTS OF CO-OPERATIVE EXPERIMENTS IN POULTRY RAISING.

By W. R. Graham, Agricultural College, Guelph.

Our co-operative experiments in poultry have so far dealt largely with the use of incubators. Next year we propose to take up the work of breeding with the object of securing hens that will give the best results in egg production. In this connection we shall endeavor to ascertain whether the hen that lays two hundred eggs in a season will produce pullets which will lay two hundred eggs in their turn. This I regard as one of the crucial points in the poultry business. In these experiments we shall use trap nests so as to keep track of what each hen does in the way of laying. The eggs will then be hatched and the chickens reared in order to ascertain whether the birds will equal the parent hen as egg producers. An experiment of this kind will be a difficult one to undertake, and careful, painstaking experimenters will be absolutely necessary. Two or three of our ex-students have signified their willingness to undertake it and I hope others will follow.

This year in our incubator work we had nine successful experiments. Nearly 14,000 eggs were used of which 81 per cent. were fertile and gave on an average one chicken for every two eggs. This we have considered for some time to be about an average result. A large number of our experimenters and others engaged in poultry raising have not been successful in rearing the chicks after they were hatched. Last year, for example, we had a man who set 6,000 eggs from which he hatched 2,700 chicks, but two weeks afterwards only 700 remained alive. Some, however, do not appear to meet with this difficulty. One of our experimenters the last year set 960 eggs and hatched 579, and at the end of two weeks 516 were alive. The question arises, what is the cause of this startling mortality in incubator hatched chicks? This unsatisfactory conditions of affairs is so prevalent that Messrs. Elford, Baldwin, and myself visited various poultry plants in Ontario, Quebec and New York State in order, if possible, to solve the mystery. Our conclusion was that it was not the fault of the incubator or brooder, but was the outcome of conditions which were largely under the control of the operator. In almost every instance where this high mortality occurred, we found that there was an excessive amount of carbonic acid gas in the room where the incubator was operated, due to unsatisfactory ventilation. Chickens hatched under these conditions died before reaching the age of two weeks. In one or two cases, however, the same result occurred where the room was sufficiently ventilated, as far as we could ascertain. In such cases I am not prepared to state positively what condition produced this result. The cause of death in all cases appeared to be that the young chicks were unable to assimilate the yolk taken into the system just previous to hatching. In no case have I observed this trouble to occur with hen-hatched chicks. The conditions that bring about this result may be one or more of the following: lack of ventilation; insufficient exercise after hatching; temperature of the brooder; improper food; unthrifty breeding stock. It is my intention to continue the investigation until we ascertain just what the trouble is with incubator hatched chicks.

Mr. A. E. SHERRINGTON: I have never used an incubator, and have made up my mind to let my hens do the hatching until conditions are better understood. We have hatched in this way 90 per cent. of the eggs and have raised 98 per cent. of the hatch. Our hens are early layers, and we have no trouble in getting enough broody hens among the older ones along in April. Our chickens are allowed plenty of yard room which I think is an important factor in successful poultry raising.

GEORGE A. ROBERTSON said that he had bought a new incubator that was advertised to hatch 100 per cent. or better. It had in reality brought out 5 per cent. He had found that incubator hatched chicks were smaller than hen hatched chicks at the same age.

Mr. GRAHAM, while admitting that there was much truth in the remarks of Messrs. Sherrington and Robertson, pointed out that the method of hatching by the use of hens was far too slow for any one who was engaged in the business on a comparatively large scale.

President ELFORD: I do not think the impression should be given that the incubator is in all cases to be condemned. I know of an instance of one woman in the Province of Quebec who obtained 220 aggs from one of the Dominion Poultry Stations. These were hatched in an incubator, and from the hatch over $100 worth of product has been sold, and there is still on hand one of the prettiest lots of White Wyandotte pullets one could wish to see. I know of another instance where a man raised 1,000 chickens from two incubators for which $500 were realized.

REPORT ON INVESTIGATIONS REGARDING FARM FORESTRY IN ONTARIO.

BY E. J. ZAVITZ, AGRICULTURAL COLLEGE, GUELPH.

Farm forestry in its various relations has been frequently discussed at the annual meeting of this organization.

This discussion can probably best be carried on under the four clauses which are contained in the resolution adopted by the meeting in 1903. The Ontario Agricultural College and Experimental Union at this time urged upon the Government the necessity:

"(1) For establishing at the earliest possible date a School of Forestry, where instruction will be given in practical methods of dealing with forestry problems:"

"(2) For collecting accurate information from the municipal authorities as to the amount of lands unfit for agriculture in the settled townships of Ontario:"

"(3) For undertaking the practical reforestation of areas sufficiently large to afford forest conditions, as a demonstration of the utility of the work on these lands, which, from their surroundings, enjoy practical immunity from fire;"

"(4) For considering some means of adjusting taxation so as to encourage rather than discourage the preservation of farmers' woodlots."

The above resolution covers the greater part of our needs and in its scope is very creditable to the committee which framed it.

The first clause, pertaining to a Forestry School, is worthy of further consideration. Forestry is a profession and requires special training. We are able to give the student at the Ontario Agricultural College sufficient training so that he may intelligently handle his woodlot or planting operations on his own farm. There is a great need, however, for specially trained men who can do the work required to carry out a rational forestry policy for this Province. We have a number of young men in Ontario at this present moment who desire to make this their life work. They can obtain this training only by leaving the country. The carrying out of forestry work in relation to agriculture and in relation to our great timber resources requires that such a School be established at an early date.

The second clause, pertaining to the collection of accurate information regarding non-agricultural land is of special interest.

In many townships there exist waste lands in such large areas as to make the question of municipal forest reserves well worth considering by the local authorities. The waste land, such as sandy or gravelly spots, steep hillsides, rocky fields, etc., can be used for forestry purposes. It is with such land on the farm that we are directly interested, and if it can be shown practicable to plant such land, it is but a short step to greater problems.

The third clause, pertaining to reforestation on areas which are practically immune from fire, is anticipated in the above clause. We have at present a forest nursery, in which we are producing stock for this purpose. Work of this nature cannot be rushed and requires patience. Last spring two experimental plantations were made, one in Durham County, on waste land which had once been cleared for agricultural purposes, and one in Norfolk County on a steep hillside. The plantations were made at a very small cost, and although the Durham County plantation of white pine, red oak, and white ash did very well this summer, I would not like to report until the second season, as the first winter has many dangers.

This coming spring we hope to plant in several parts of the Province and will be able to distribute a large number of trees. Applications for trees to be planted in the spring of 1907 should be sent in by the middle of June, 1906. Further announcements will be made regarding this work.

The fourth clause, pertaining to taxation of woodlands, is one which is worthy of consideration. A recent article in the *Canadian Forestry Journal* by Dr. J. F. Clark, a member of this organization, is well worth study by any one interested in this question.

From the article I take three very pertinent questions:

(1) Should assessment valuation apply to values of the land plus timber, or to the value of the land alone?

(2) Should the rate basis for the forest crop be the same as that for annual field crops?

(3) Are there economic reasons why woodlands should be taxed at a different rate from lands producing other crops?

The tax rate on woodlands is a vital question and will have much to do with the question of conserving our forest and woodland areas or planting waste lands in the future.

The question of planting tree clumps on dairy farms or in permanent pastures for protection to stock is also worthy of your attention.

Much has been done by the efforts of the Experimental Union in forwarding the forestry movement. I hope in annual meetings to come that members of this Association will be able to report on plantations made on their own farms.

E. STEWART, Secretary Canadian Forestry Association, Ottawa: I am glad to know that Ontario is at last beginning to take a deep interest in the forestry question. In this respect there has been a marked awakening within the last few years. According to the last census of 1901, the area of timber in occupied farms in this Province was only 22 per cent., and 35 per cent. in Quebec. In many parts of the country, however, the average is not nearly as high as this. Along the valley of the Grand River, for example, only five per cent. of the land is in timber; but the general average is helped out by the farms in the northern sections of the Province.

In the northern part of the Province there are many townships that ought to have been reserved entirely for timber, being much better suited for that than for agriculture. This I observed many years ago when I was engaged on survey work, and I urged upon the Government that an attempt should be made to explore the land in advance of the surveyor and the settler so that it would be possible to decide what land was fit for agriculture and what should be left under forest conditions. This is now one of the recognized objects of the Canadian Forestry Association.

In dealing with conditions as we find them in Ontario, two lines of work may be followed. First, re-forestation, and second, preservation of the existing forests. In reference to reforestation, I think efforts should be directed to the encouragement of tree planting along the lines land down for the conduct of this work in the Northwest. I do not consider that foreign methods of re-forestation are applicable in a country so large as ours. I believe you are soon to start the distribution of seedling forest trees from the College, and if so, an outline of the work as conducted in the Northwest may be of service. There the system adopted is co-operative in its nature. Any settler wishing to secure trees makes application to the Department one year in advance of planting. The inspectors afterwards examine the farms from which application is made, give instructions as to how the land is to be prepared, and examine the soil to ascertain what varieties are best adapted to it. The owner then enters into an agreement to prepare his land in accordance with instructions, to keep his trees in cultivation for a sufficient length of time, to properly fence and protect his lot and not to cut his trees without the authority of the Department. So far we have sent out our trees by express free of charge. This may seem to be a little paternal, but it was considered to be only fair so long as the work was in an experimental stage. The first year we sent out 2,000 trees. Last year the number had increased to over 2,000,000 and altogether we have distributed over 5,000,000 trees. The result of last year's inspection shows that 85 per cent. of the trees are living and in favorable condition, which, I think, is a very satisfactory result. We think that the Government is warranted in going to this expense because of the benefit which will result to the whole community.

As to the taxation of woodlots, I believe the present Assessment Act compels the assessor to assess all real property on its actual value. To attempt to tax land on the actual value of the forest each year is certainly a great injustice, and I am glad to sav that this matter will, in all probability, be dealt with before long.

I think the time has come when we could very profitably have a forestry school in Canada in connection with an institution such as this. Hitherto our young men who wish to obtain special instruction in forestry have had to go to the United States for it. When I was acting as Dominion Forester, I secured the services of Mr. N. M. Ross, a graduate of this College, who subsequently studied with Prof. Schenk of Baltimore, N. C. I later on obtained the services of another young man, Mr. Roland Craig, a graduate of this College, who afterwards studied with Dr. Fernow, of Cornell. It would be a great advantage if our young men could obtain technical instruction in forestry under native conditions before taking a course abroad, which might follow well enough as a later development.

Major SHEPPARD: The farmers of this Province are becoming very much interested in the subject of forestrv and ask many specific questions which institute speakers are unable to answer. I have been asked a number of times, "What is the quickest growing tree for fence posts?" The planting of hillsides is another matter on which information is required. The farmers are looking for practical information of this kind which they can make use of.

Mr. STEWART: Catalpa is a rapid grower in the southern section and would answer for fence posts very well indeed.

E. J. ZAVITZ: The question of fencing material is a very important one. Reports from Nebraska and Kansas state that Catalpa and Black Locust will produce a fence post in ten vears. We have no local data on the subject but intend to investigate it. The method of growing Catalpa in the West is to cut off the plant close to the ground at two years. It will then give a clear post, so far as length is concerned, in one season, and in four or five years good timber is secured.

Q. What is meant by Black Locust?

Mr. ZAVITZ: We have two species of Locust in Ontario, both of which were introduced, the Honey and the Black. The Black Locust has a short thorn and rough bark and was never used for hedges. I have found trees in almost all parts of Ontario.

Q. Has the Black Locust the same amount of root development as the Honey?

Mr. ZAVITZ: It has a wonderful root system, but that is no argument against it as we propose to grow our fence posts on the poorer classes of land. It is a hardy tree and will stand adverse conditions.

Q. The extended root system would be an objection to growing it for fence posts in position.

Mr. ZAVITZ: Our idea is to grow the posts on some unused portion of the farm and then to cut them.

Q. Is the tree as subject to borers as the Honey Locust?

Mr. ZAVITZ: It is very subject to them in the southern part of the Province, but it seems to overcome them.

Prof. C. A. ZAVITZ: At my old home in Middlesex County we planted Black Locust trees about thirty years ago on one side of the woodlot. They have developed into fine straight trees and we have used some for fence posts with very satisfactory results.

Major SHEPPARD: They have started to make cement concrete posts in our district and also telegraph poles, and they are proving very satisfactory. I think they will supplant wooden posts in our section.

HON. NELSON MONTEITH: I am glad to see that the members of the Union have not lost interest in this important question, and I may say that it never had greater importance than at the present moment. Not long ago a deputation of lumbermen which waited upon the Government stated that the end of the commercial pine in this country was in sight. When responsible men make statements of that kind, and when an agitation is on foot to have an import duty placed on woods coming into this country for construction purposes, it seems to me that it is high time that this subject should be actively taken up. Mr. Wellington told me in conversation not long ago that the Honey Locust would, in twenty-five years, give a growth equal to three post lengths. In my opinion, however, we are using for fence construction purposes more posts than are actually necessary. Inside fences might be done away with to a great extent. There is no reason why with modern woven wire fencing, the inside fences should not be largely of a moveable nature, if solid anchor posts are used. By this means fences could be changed from field to field as required.

In regard to our forestry work in the Northwest, I should like to know how many trees are sent to each grower, the size of the trees sent out, and how long supervision is continued. I may say that it is the desire of the Government to help on the work of reforestation, especially on the farms. You will have noticed by the press that a chair of Forestry is being established in connection with the university. It is not proposed, however, to interfere with the work that is now well under way at this institution. The intention is to endeavor to supply the education which our young men now have to go to the United States to secure.

MR. STEWART: We find that about 1,500 trees as a rule are as many as can be properly attended to the first year. If they are well cared for, more may be sent in succeeding years. We have not placed any limit on the number. As to the age of the trees, we plant fast growing trees, such as Manitoba Maple and Green Ash. These are ready for distribution in about two years. Our agreement provides that we may go into a plantation and take any seed, seedlings, or cuttings that are not required by the owner to extend his plantation. As to supervision, each inspector is provided with a map of his district, with the plantations laid down thereon. These plantations are visited every year until the trees are high enough to shade the ground, when they no longer need cultivation. This will probably be when they are five or six years old.

THE FORESTRY PROBLEM IN CANADA.

BY E. STEWART, D.L.S., DOMINION SUPERINTENDENT OF FORESTRY, OTTAWA.

I am glad to know you esteem the forestry problem in this country of sufficient importance to warrant you devoting an evening to its consideration.

Living in a timbered country the people of the older Provinces of Canada fancied they knew all about the forest, whereas their konwledge was generally confined to destroying it. While we realized we had much to learn regarding agriculture, horticulture, dairying and kindred subjects, the idea that any technical or practical knowledge could be derived from a study of the forests was scarcely apprehended, much less appreciated as necessary to the woodsman or to any class of our people. The fact was that the natural forest was so independent of us, so much like many of the other free gifts of nature, that while we might admit that we were to a very great degree dependent upon it, yet we seemed to assume that it was a part of our rights that nature owed to us, and that it would, without any attention on our part, continue to yield plentifully for all time, like water or air to our wants; and the reason for this indifference is not far to seek. It performed all its functions without our aid, from the sowing of the seed to the time of harvest, and we took no notice of the operations of reproduction and growth so silently yet so constantly going on in those sylvan solitudes. The tree asked no questions of us and we were quite content to ask none of it. To us, like Topsy, it simply "growed." The result is that, now when it is desirable to perpetuate a supply of wood in the older Provinces and to propagate trees on our western prairies, we find our people as a whole possessing very little real knowledge of the habits of propagation, of growth and development, of the different varieties, even of our common trees, with whose appearance they are as familiar as with the hills and valleys on which they formerly grew.

The attention of the lumbermen, too, so far as his bush operations were concerned, has been hitherto confined entirely to cutting and transporting his logs to the mill, no account being taken of any timber not large enough to make a saw log. No thought of a future crop was ever considered.

After the logs were removed the inevitable forest fire came, burning up the debris and destroying at the same time every green tree, including in many cases valuable second growth of the same varieties as had been cut. These fires not only destroyed any seed trees that escaped the axe, but also burnt up any seed that might be lying on the ground, thus practically destroying all hope of a second natural crop on the same soil for years, if not for centuries. The result was that the seeds of the poplar and birch which, owing to their small size and to the fact of their being winged will blow over long distances, fell and took root on a well prepared soil, while the more valuable coniferous varieties, such as the pine, larch and spruce, having very much less migratory advantages, were handicapped and unable to retain a foothold where in the past they were the kings of the forest.

When we ascend from the mineral kingdom to the next higher in nature, the vegetable, to which trees belong, we perceive that the chemical forces have found a new ally in that unknown something which we call life, by means of which the mineral substances are combined and transformed into products which are unknown where its wonderful influence is not exerted. By means of life this transformation is not only brought about, but its operations are continued indefinitely where opportunities are afforded it to work its miracles. When we look around on this new world as distinguished from the cold inertia of the mineral kingdom we realize that we have passed from a state of death to one of activity and life; from a realm where no increase is possible to one where vitality is performing its marvellous work by which the world is constantly being replenished and resupplied.

Unfortunately in America our woodsmen have failed to recognize any distinction in the economic products of these two kingdoms of nature. Is it not a fact that in the main they have treated our magnificent lumber woods as they would a mine from which a certain amount of wealth was to be obtained and then abandoned as of no further utility; utterly failing to so harvest the timber crop and to protect the remaining trees that growth and reproduction might continue on the same area indefinitely. I say "indefinitely," for it is a well known fact that a continuous growth of trees does not (as in the case of vegetables and cereals) impoverish the land if the fallen leaves are allowed to remain on the land. The same varieties can be grown for ages on the same soil.

President Roosevelt, in his first message to Congress, drew particular attention to the subject of forestry in his own country, and in his strong epigrammatic style used two very striking sentences which apply equally to the situation in that country and in Canada. He says: "The preservation of our forests is an imperative business necessity," and again, "The forest and water problems are perhaps the most vital internal questions of the United States."

I am fully aware that the subject of our forests is far too large to be dealt with exhaustively in one evening, and I shall therefore only touch very lightly on some phases and perhaps entirely omit others that would each form a fitting theme for a lengthy review.

The history of forest growth in past ages alone would lead us far back into the dim ages of prehistoric times, of which the geologist would be the most competent to speak. Extending far back into those distant eras even to old Devonian and Silurian ages, the forest grew luxuriantly, and though men apparently had not then appeared on the scene the vegetable kingdom was at work preparing for his advent by storing up the coal measures which he is now applying to his varied wants and uses.

Coming down to a more recent date we observe in this part of the globe the evidences of the alternate growth and destruction of all vegetation, including that of the forest, as our planet traversed the glacial and interglacial periods of its history.

But our object at present is not with the operations of nature in those bygone ages, but rather with the forest as it exists to-day, with the various functions it performs in the economy of nature, and especially as its existence and functions relate to our own country.

Forestry deals with the growth of trees together in large quantities and frequently of different varieties, and in any study of the subject the individual unit of the forest, namely, the tree itself; the manner of its growth; its relation to and influence on others growing near it; the functions it performs while growing and the product it supplies must be taken into consideration.

Trees in common with other vegetable substances are made up of tissue composed of cells; and the elementary substances of the former are: Carbon, 50 per cent.; hydrogen, 6 per cent.; oxygen, 42 per cent.; nitrogen, 1 per cent.; mineral ash, 1 per cent. The carbon is derived from the carbon dioxide (carbonic acid) of the air which enters into the leaves and through the action of light, air and water is decomposed. The oxygen is liberated and the carbon is retained, and in combination with water from the roots forms starch, sugar, gum and other plant foods. Now here is one of the functions performed in this operation. Of the water taken up from the soil and transpired through the leaves only a very small part, less than 1 per cent., is retained in the tree. The remainder is exhaled from the leaves and passes into the atmosphere, rendering it more humid in the vicinity.

Nature is frequently accused of prodigality in her methods. As Dr. Fernow says in his admirable work on "Economics of Forestry," "She takes no thought of time or space," both of which are lavishly at her hand, but here is an instance where she metaphorically kills two birds with one stone, for in her task of building up the tree she at the same time uses it as a medium to convey water from the subsoil to the tops of the trees where in a rarefied form it is distributed through the air over a larger or smaller area in proportion to the area of the forest.

If we visit any of our virgin forests we will behold its products in every stage of growth; and not only of growth, but of decay as well. We will see the young seedling just starting out on its long career, perhaps of centuries; others in the adolescent stage; others in their primal vigor, and others again showing that nature has about accomplished her task, that full development has ended, and that the time for the harvest has arrived. We will also see the fallen timber going back into the soil, and this has been going on for centuries. It would be difficult to estimate the loss that the public is annually sustaining through this unharvested crop in districts that are now accessible and where the product has a market value.

Let us now consider the influence of one tree on another. We will here see a great struggle going on, not only for existence, but for supremacy. We will observe one species in deadly conflict with another for the mastery, and not only this, but individual trees of the same varieties with each other for dominancy. There is no field of nature where Darwin's great law of the survival of the fittest is better exemplified than in the forest. The most careless observer cannot fail to see in our thick woods the battle that is there being constantly waged: how the healthy and strong are stretching up to the light, overtowering the laggards in the race, and by the shade cast by their leaves, depriving the latter of the light until finally those that demand the sunlight and are thus deprived of it languish and finally pass out of existence. But note well that these unsuccessful competitors, though they failed in the race, yet in their struggle and during all its progress were aiding in the development of their rivals and final conquerors, for by their presence they crowded out the light from the lower limbs of the surviving trees and thus gave to the latter a clean trunk. In fact they did the pruning for their enemy which was essential to render it a good timber tree. I need not say that by this means, this natural pruning, all the valuable timber trees in our natural forests have attained their form and their value for commercial uses.

I would like now to call your attention to the functions that the forest exerts in the conservation of water and in regulating its flow, and in this connection I will require to say a few words of a meteorological character.

The heat of the sun both on sea and land, but especially on the sea, is constantly converting vast quantities of water into vapor, which, obeying one of the great laws of nature, rises in the air until it reaches a state of equilibrium. It is then carried by the air currents till it meets with a colder temperature when it condenses. Its density is then increased so that the atmosphere is no longer able to sustain it and it falls to the ground in the form of rain, hail or snow.

Now, it is obvious that the greatest evaporation, other conditions being equal, will be where there are the largest bodies of water, and a little reflection will also convince us that precipitation will be greatest there also, for those regions remote from where the evaporation takes place will only receive that portion that has escaped condensation in the journey through which the vapor has been carried. A good illustration of this is afforded by the large rainfall of the east and west coasts of this continent, and also in the neighborhood of the great lakes and the very light annual precipitation in the plains of the interior of the continent where summer droughts are constantly feared and where in many cases irrigation is necessary to plant growth.

The precipitation is greater on mountains than on the low lying land in the vicinity. This land elevated high above the surrounding country intercepts the air currents fully surcharged with vapour which at these cooler heights is about at the point of condensation and the result is that a very large amount of moisture is deposited there where gravity again resumes its functions to convey the water back again to its home in the sea.

In these operations so far, that is, in the evaporation, conveyance of vapour and precipitation in liquid form, it is evident that man has and can have no part whatever, but once the water starts on its downward course from these elevations, then his actions may affect the rapidity of its course, and it must be confessed that all too frequently his interference here has been prejudical rather than beneficial.

Purpose and design are characteristic of every operation of nature even though we sometimes fail to comprehend them.

Let us consider the object in view in all these elaborate operations. Evidently one purpose at least was to supply the great valleys lying between the mountains and the sea with an even and perpetual supply of water without which both animal and vegetable life could not exist. But it is evident that the elaborate operations we have noticed; the condensation of water into vapour, the transport of the latter to the inland regions, with the condensation and precipitation at those high elevations; would fail to fulfil the evident design if there were no barriers to prevent the rapid and tumultuous escape of the water from these heights, and in order to accomplish this and thus prevent disastrous torrents at one time and drought at another we have a network in the forests that in a natural state when not destroyed always grow on the mountainsides forming a natural reservoir of which the artificial reservoirs for the water supply in our towns and cities are, in a sense, but poor imitations.

From what has been said it will be noticed that we have several distinct divisions, so to speak, in this work: First, evaporation; second, the transport of vapour; third, condensation; fourth, precipitation, and lastly, dissipation. By the last term we mean the disposal of the water after condensation, and there are two ways that this may take place, namely, either by evaporation into the air, or by the agency of gravitation which will ultimately carry it back again to the sea; and the forest assists in retarding dissipation in both cases. The shade and consequent lower temperature and absence of strong air currents retard evaporation which consequently is many times less in the forest than in the open field. Again, the absorbing qualities of the forest floor are very much greater than in the open. The soil is loose and is covered with leaves, moss and decaying timber. The roots of the trees serve as pipes to carry the water down deep into the soil. In this way a great natural reservoir is formed whose outlets are the thousands of perennial springs and brooklets that evenly and continuously go to feed the larger streams and these again the great rivers of the country. Now consider the effect produced if this timber is removed. There is perhaps not much difference in the amount of water precipitated, but instead of being absorbed as before, the greater part of it being unobstructed in its course rushes down the mountain side in torrents; disastrous floods follow, often carrying away bridges and inundating fertile low-lying valleys and carrying away alluvial soil down to the mouths of the streams where it is deposited in great bars, thus impeding navigation and annually entailing large sums of money in removing it.

This is the result of interference with nature. We have seen the elaborate means she employed in depositing this water at those elevations. She has woven, as we have seen, a net-work for the conservation and even runoff of this supply and all she asks is that we do not prejudicially interfere with the tree, for all the valuable timber could be removed when it attained a proper age without in the least injuring the forest floor for this purpose. Again, she does not ask you to reserve the fertile valleys, but only the rough mountain side where the elevation is frequently too great for the growth of cereals and where the land is better adapted for the production of timber than for any other purpose.

The people of North America have been exceedingly profligate in this regard and the penalty is being paid every spring, first in the disastrous floods experienced in so many localities, and later on in the season by the drying up of the once never failing springs and perennial streams; and it is time a note of warning was sounded that would arouse our people to a sense of the danger that threatens us in this regard. If anyone should question our reasoning on this point, let him but look at what has actually occurred in older countries where irrational forestry methods were pursued in the past. Take a large portion of Europe bordering on the Mediterranean in Spain, Italy and Greece, as well as large tracts in Northern Africa and in Asia Minor, where in the middle ages were to be found fruitful valleys and the homes of a prosperous rural population, but which to-day is almost a desert, where the inhabitants are reduced to beggary by the drying up of the country consequent on the denudation of the forest on the mountain sides.

But we have examples even in this country every spring in the disastrous floods that are now occurring on streams which in former years, before the country along their upper valleys was denuded of its timber, caused no inconvenience to those living on their banks.

The change in this respect within recent years in the older provinces is very marked. The breaking up of the ice in the spring causes every year great anxiety to those living along such streams in Ontario as the Thames, the Grand, the Moira, etc., and the great floods annually occurring in Pennsylvania, including the disastrous one at Johnstown a few years ago, are directly attributable to the clearing away of the forest in that mountainous region.

A few years ago when Captain Eads went down the lower Mississippi to build dykes along that stream and jetties at its mouth, he made the remark that he was working at the wrong end of the stream, and it was more than sentiment that caused the Boston philosopher, Thoreau, to exclaim as he witnessed the destruction of the forests on his New England hills: "Thank God, they cannot cut down the clouds."

There is nothing that demands greater public attention at the present day than a wise policy regarding the preservation of a fair percentage of forest in the country and especially at the source and along the upper valleys of our great rivers. The State of New York is now buying back at great expense from the owners a large tract of country in the Adirondacks in order to prevent destruction to the Hudson, the Mohawk and other streams that have their sources there. Fortunately Canada is in a better position in this respect, for most of the land at these watersheds is still held by the Crown and not one day should be lost by the provinces as well as the Dominion and some of the Provinces, among which your own is foremost, have withholding from settlement the territory within their limits. The Dominion and some of the provinces, among which your own is foremost, have within recent years very wisely reserved certain areas at the sources of water supply, but much more should be done in this regard.

With reference to this subject I wish it understood that I am not advising that lumbering operations should be prohibited in these places; on the contrary, I would reserve these tracts perpetually for timber purposes by withholding the land from settlement and appropriating it for the purpose for which it is best adapted and for which nature intended it. In Dominion territory we are endeavoring to work on these lines, and we have now upwards of a dozen timber reservations, and it is the intention not only to make reserves at watersheds but to appropriate for timber any forest territory which is better adapted and can be more profitably used for the growth of timber than for other purposes.

It is well established that a certain proportion of the area of a country should be retained in forest. This may vary, according to prevailing conditions, from ten per cent, to twenty-six per cent., and this should not be lost sight of in the settlements there are now being formed in our new territories both in the Dominion and the Provinces.

In this connection I think it would be wise for the governments of the several Provinces and the Dominion as well to enact that in all future patents from the Crown of timber land a stipulation or proviso should be inserted that at least ten per cent. of the area conveyed should be left in forest, that the timber growing thereon should be the property of the owner of the land but to be cut only under the direction and supervision of the Government. Unless I am wrongly informed the old Upper Canada Land Company made such a provision in some of their deeds, and I am informed that the seigneurs of old Lower Canada frequently made the same reservations in their deeds.

Canada now seems on the eve of attracting to her shores that stream of immigration which heretofore has gone to the United States, and she is now assisting in bringing this about, but the duty of the Government, both federal and provincial, does not cease when they have succeeded in bringing the new settlers into the country. Much will depend, as to the future success of the efforts being made, in directing immigrants to proper localities suited to their varied pursuits; and in order that this may be properly done it is necessary that these new districts should be explored in advance of settlement and only such districts as are better adapted for agricultural pursuits allowed for that purpose, and such as are better suited for the growth of timber retained in forest. We have not far to go in any direction in Ontario and Quebec at least to find township after township where settlers are endeavoring to grow crops on land that would have been much better if utilized for the growth of timber.

What I have said regarding the necessity of preserving in forest a proportion of the territory in the Provinces of Old Canada applies with even greater force to the sparsely timbered districts of Manitoba and the great North West. We are looking to this part of the Dominion with prophetic eyes and the vision of the future is most enchanting as we contemplate its wondrous possibilities, but if our dreams are to be realized we must act warily and wisely in husbanding the gifts of nature which form the basis of its wealth. Its future depends on the power of its soil for the production of cereals. The soil is all that could be wished, but the soil requires the element of moisture to germinate the seed and bring the plant to perfection. The husbandman of the plains no longer fears the summer frost half as much as he does the summer drouth; so to use every means to conserve moisture in the soil should be the aim of the people in that country. Recognizing this fact, it is the aim of the Forestry Branch of the Dominion Government to preserve with zealous care whatever timbered tracts exist there. Fortunately, contrary to public opinion, that country is not all devoid of timber. Only about one half of Manitoba is open prairie, and though it does not contain a vast quantity of timber yet we have a considerable quantity, among others we have one most valuable tract in the Riding Mountains. It consist of about 45 townships or over one million acres, the greater part of which is well wooded. It is the source of a great number of streams, some of which are of considerable importance. The Assiniboine, which next to the Red River is the largest in the Province, receives the greater part of the waters from tributaries that have their source in these mountains. This is the natural reservoir which supplies water to a very large and very fertile part of Manitoba, and whenever an opportunity is afforded I can never refrain from urging on the people of that Province as strongly as I can the absolute necessity of retaining that forest intact. Denude these mountains of their timber and the result would assuredly be disaster to one of the most fertile sections of the whole North West. The Assiniboine would be a raging flood for a few weeks in the spring and after that a water famine would ensue. In time the springs, brooklets and wells would fail, and we would no longer as at present look with confidence year after year to the Portage Plains and other districts as well to produce the rich harvests for which they are noted. I refer to the Riding Mountain as an example out of many that might be named.

I will refer to only one other, and that is the east slope of the Rocky Mountains. From the precipitation on the east side of this great mountain chain the two great branches of the mighty Saskatchewan River as well as the great Mackenzie receive their supply. Here again nature has placed a guard to retard the hasty flow of the water in the forest growth extending from the lower foot hills right up to the bold escarpment of that great Atlas, if I may so term it, of North America. Permit the destruction of this timber by fire or otherwise, and disaster will not be long in overtaking the whole of the western territories. The rich grain fields of the Edmonton district will soon cease to yield their accustomed crop. The herds that now feed on the rich grasses of Southern Alberta will wander aimlessly in search of their well known streams. The hundreds of miles of irrigation canals and ditches there will be transformed into raging streams for a short time in the spring and later on in the season will be as dry as the surrounding plain.

But while every citizen of the Dominion is more or less interested in that great heritage that we possess in the North West, those of you living in the Province of Ontario have no more important question demanding your immediate attention than that concerning the management of the great forests within your own Province. I do not propose to go into statistics to show the value of the annual product of your forests, but I will venture this statement, that if wise methods are continued in the management of your timber areas, not only will they continue for all time to be a source of great wealth and profit to the individual owner but also to furnish even a larger revenue to the Province than heretofore in addition to the economic functions I have referred to.

It was thought by some a few years ago that the great increase in the use of iron, brick, stone and cement in structural works would decrease the demand for wood for such purposes, while a similar effect would follow from the more general use of coal for fuel. This, however, has not been the case. As for the displacement of wood by coal, German statistics show that from the beginning of the last century when coal began to be generally used as fuel the wood consumption increased in the proportional rate as that of coal.

This increase of wood consumption with that of the other materials I have mentioned, as Dr. Fernow says, simply accentuates the influence of the great modern development and increase of civilization, which means increase in the wants of the population.

The manufacture of pulp and cellulose alone is now consuming immense quantities of our spruce and other woods. Taking the whole consumption of wood the world over for the various uses to which it is applied, and then taking into account the visible means of supply, the outlook is by no means reassuring. One thing is certain and that is that a time of great scarcity is within the near future, if the timber producing countries do not at once commence to husband the forest wealth which they possess but of which so many of them seem to be oblivious.

The history of the increase in the value of forest products in Europe within the past one hundred years may be taken as indicating what the advance in price of these products will probably be in this country within the present century.

What must be the result of an ever increasing demand where the supply the world over is diminishing?

Our total exports of wood and manufactures thereof of home produce amounted in 1903 to $40,742,641, being an increase of over five and a half millions over that of the previous year, and of this the United States took $18,823,878, which was also an increase over what she took from us the year before of over two millions.

Even Germany, which has taken the lead in conserving and managing her forests, has been importing timber since 1863, and now pays annually over $17,000,000 to foreign countries for that article.

A few quotations from the best authorities on the subject cannot fail to convince us that the alarm with which they view the situation is well founded.

Mr. JOHN NISBIT, of Great Britain, and formerly of the Indian Forestry Service, in an address in 1899 before the Royal Scottish Arboricultural Society, quotes approvingly an article which had appeared in the London *Times* shortly before, in which attention is drawn to the increasing scarcity of the world's supply of timber. The writer of this article states that Canada is rapidly becoming the only country in the northern hemisphere which can afford to export timber; that the other countries which possess it in excess of their own requirements are Russia, Norway and Sweden; that the forests of Russia are situated along rivers flowing into the Arctic Ocean and are consequently useless for the purpose of floating logs to market, and that no method of land transport has ever been devised which will carry timber for long distances cheaply enough to bring it into practical competition with water carried logs. For this reason he states that the forests of Russia may for the present be regarded as commercially inaccessible. As to Norway and Sweden he says they are hardly able to support the deficiency of Germany, and goes on to say that all other nations requiring timber of the varieties grown north of the equator including the United States must look to Canada.

In the report of the same society for the year 1901, Dr. A. Schlich, one of the best authorities in the world on the subject, gave a very exhaustive paper on "The Outlook of the World's Timber Supply," at the conclusion he stated that "the great future standby for coniferous timber will be Canada."

M. Melard, Inspector of Forests in the service of the French Republic, in his recent work on "The Insufficiency of the World's Supply of Timber," says:—

"There are but seven countries at present able to supply large quantities of timber. Five are in Europe, namely, Austria-Hungary, Sweden, Norway, Finland and Russia, two are in North America, namely Canada and the United States. It has been shown that the available surplus of Austria-Hungary, of Russia and of the United States is seriously threatened by increase of population and by industrial development, and that of Norway by the abuse of the axe. There remain only three sources of supply in which confidence can be placed for yet a little time. These are Sweden, Finland and Canada. They are absolutely and hopelessly insufficient. If Sweden, Finland, and Canada were to attempt to supply all the countries which reach out their hands for timber, their normal production, and their forests too, would be disposed of completely in a very short time, revenue and capital alike. A timber famine is thus within sight."

But it may be said that this is the view of an alarmist who has not studied the past history of the world. It may be truthfully pointed out that nature has always come to man's relief in his extremities; that when wood fuel became scarce in the older countries of the world, coal was found to replace it, and that in recent years natural gas and petroleum have in many localities even replaced the coal. While this is true we must remember that these are both inert materials without the power of reproduction or the ability to increase the quantity; that every pound of coal and every foot of natural gas used decreases the aggregate quantity by that amount; and without going into details it may be said that the increasing use of these materials is becoming so great as to indicate a famine here also in the not distant future. But the close observer will reply that even if these sources of fuel supply were entirely exhausted we have at least in this country another natural agent to fall back upon in electricity which can be generated in enormous quantites by the power now unutilized in the thousands upon thousands of water power to be found in almost every part of the Dominion. This is undoubtedly true and leads me to an almost virgin field. I am of the opinion that this country has advantages in this respect which few countries can equal, but what would be the value of these water powers unless the reservoir from which the water is derived is preserved by the forest in the neighborhood of the source of supply, thus ensuring an even and continuous flow.

We have already noticed how our export of timber to foreign countries is increasing from year to year, not only to the old world but even in a greater ratio to the United States. We have quoted the opinions from the best authorities in the world, that their only hope for the future is in Canada's supply, but there is one quarter from which an ever increasing demand will come that we have not so far noticed, and that is from our own people.

We find the total value of forest products as given in the census returns for 1901 to be $50,183,044, whilst the exports for the same year were only $32,842,180, leaving $17,330,854 as the value of our home consumption. What the increased future home consumption will be will depend on the increase of our population, and when we witness the rapid increase of immigration during the past few years into a country such as our North West prairies, where every stick of timber used has to be brought in, and when we see the vast extent of that country to be supplied, it is evident that our home market for lumber will continue to enormously increase. Taking this along with the foreign demands we cannot but conclude that we will require an immense supply to meet all these requirements.

Have we such a supply?

Quantity of Timber.

Until our great north wilderness is better explored, it will be impossible to make anything like a correct estimate even of the wooded land, much less of the quantity of timber growing thereon. According to the last census of the Dominion the whole land area of Canada is set down at 2.316.684.071 acres. Of this less than $1\frac{1}{2}$ per cent. is improved, namely,

	30.166.033	acres.
Probably the bare prairies of the N. W. occupy	160,000,000	"
and the barren lands of the far north four times that of the prairie	640.000,000	"
Making a total of untimbered land of........................	830,166,033	"
Which taken from the total land area of.....................	2,316,684,071	"
Leaves.................	1,486,518,038	"

as the total area of land more or less wooded, but every woodman knows that but a small percentage of what may be termed bush land is covered with timber which under ordinary conditions would be merchantable. Let us take 20 per cent. or one-fifth of this area, as being of such a character, and this will give us 297,303,007 acres. I find that in taking the former census returns, namely, that of 1891, I have elsewhere arrived at 266,000,000 acres, and considering that our data is so unsatisfactory the discrepancy is not remarkable, and for the purposes of our calculation we will assume that the smaller figure is correct. With this data and taking 2,000 feet board measure as the average per acre over this whole area, we get 532,000,000,000 feet, as the total quantity of timber fit for lumber and pulp wood now growing on this land and of such size as might be cut under proper forestry methods. If we took into calculation the whole of the timber of all varieties and quality growing on these lands we might safely quadruple this quantity. At the lowest the stumpage, that is, the value of the timber in the tree, may be put at $1.00 per thousand, which represents only a present value of $532,000,000, which represents only what the Government might fairly ask as a royalty, and forms but a very small part of its value to the community as a whole.

In addition to this we have covering this same area an immense quantity that has not yet attained a sufficient size for cutting. This growth varies in size from the young seedling just shooting from the ground up to the young tree of ten or twelve inches in diameter, and which under proper methods of lumbering would be looked upon as the agriculturist does upon his growing crop.

When we consider this supply and also that we have the motor power as afforded by water power everywhere right at hand, Canada should be without a rival in the manufacture of all articles in which wood forms the chief ingredient.

Natural Resources.

Nature has been lavish in bestowing on this country great natural resources. Those of the sea and the forest being the easiest to appropriate, were first utilized, while those of the mine, being less certain in character and requiring more capital, are only now beginning to take a large place in the productive wealth of the country. I mention these three resources because they, unlike agriculture, represent what might be called the finished products of nature. All man has to do is appropriate them.

But of these the forest stands foremost. With the products of the field it is necessary to prepare the soil and sow the seed before reaping the harvest; in those of the mine it is generally necessary to expend considerable in development work in search of what may or may not prove profitable in the end. At best the miner is searching for hidden treasure. The fisherman casts his net into the sea with no certainty whether the return will be large or small.

It is different with the lumberman. The wealth of the forest lies open before him. The crop is his without the sowing. He simply reaps where nature has prepared the soil and cast the seed, and the centuries without his aid have nourished the plant and brought forth the fully developed product.

All natural resources should be recognized as national in character. They belong to the nation as a whole and should not be regarded as belonging to the individual or even to one generation, and the Government of the country is not only the trustee for the people of to-day whom it especially represents, but for succeeding generations as well as far on in the future as its actions can effect it.

We noticed at the outset that trees derive but a very small part of their food from the earth, and consequently their growth does not tend to deteriorate the soil as agricultural crops do, and no rotation of crops is required. The same varieties can be grown on the same soil for ages.

When the last glacial visitation was over it left the whole of North-eastern America destitute of vegetable growth, but when a milder climate succeeded, the forest, obeying that principle of life which is characteristic of it both in the animal and vegetable kingdom, namely, its tenacity to survive under any environment at all favorable as well as to propagate its kind, soon began to encroach on the treeless land, and year by year to push its way in reclaiming lost ground, so that at the time of the discovery of America there was an almost unbroken forest extending from the Atlantic for upwards of a thousand miles inland. This forest was regarded by the pioneer as an enemy to be got rid of as soon as possible. It retarded settlement and gave shelter to his enemies, and it was necessary that a very large part of it should be destroyed in order that agricultural pursuits should follow; but it is very unfortunate that proper discrimination was not exercised by the early settlers in clearing up their land. If each farmer had set aside, say at least 15 acres out of his hundred acres for a woodlot, and where a stream ran through his place had allowed a narrow belt of trees along it to remain uncut, and then when cutting had taken out the large timber, thus giving a better chance for the younger trees to grow, he could have had a continuous supply of wood and he would have done his part in conserving the water supply to which I have already referred. And again, if a few avenue and shade trees of the original forest had been left, how different would be the appearance of the landscape to-day.

It may be said that all this may be true enough, but what are we going to do about it? I would say that fortunately for us this is more than an academic question, and that a great deal can be done by the people of this country and in fact must be done, unless we neglect a duty that we owe to ourselves and to posterity.

Most of the countries of Europe early foresaw the ruin that would follow the ruthless destruction of their woodlands and took measures to prevent it.

India followed their example with most gratifying success which time will not permit me to dwell upon. But America is only wakening to the necessity of individual and united effort on the part of her citizens. In the

United States it is only within the last few years that forestry was recognized in the departments of Government, but the movement is now rapidly coming to the front. The appropriation for the Bureau of Forestry at Washington has been more than trebled within the last year.

In this country we are just starting, but the field is vast and the soil virgin. We have a vast domain of timbered lands largely still in the possession of the Crown. We have the great subarctic forest belt extending from the Atlantic to the Pacific under the control of the Dominion, besides large belts in other parts, while the great forests of British Columbia and the eastern provinces are well known.

It may interest you to learn that within the past four years a system of encouraging forest tree planting on the bare plains of Manitoba and the North-West Territories has been inaugurated and put into operation there. It is one of co-operation between the Government and the prairie settler, and I am glad to say is developing very fast. It is not necessary that I should weary you with the details, as they can be found in our printed reports.

The great majority of the prairie pioneers went from the eastern provinces, and the loneliness of prairie life was all the greater owing to the absence of trees. In his lonely hours the settler from the eastern provinces, with nothing to arrest his attention but prairie around him and the sky above, would, if he were at all imaginative, wander back to the home of his boyhood with the old farm house and the woods in the rear. Across the interval of years would come the trill of insect life and the bird songs of the forest. He would see again the paths through the woods and the brooklets and creeks flowing through them. Happy illusion, if he hopes to see the same conditions here to-day. The country is now cleared up and with it the small streams have all disappeared.

Many attempts were made to grow forest trees on the new home, but somehow the eastern farmer could raise his cereal and root crops without difficulty and yet he generally failed to grow trees, and the reason was not far to seek. He was trying something entirely new to him and of which he had little knowledge. He had a lifelong experience in agriculture and none at all in arboriculture. The forest trees in his old home were neither planted by him nor by his forefathers, and he had never had occasion to take heed to their growth. Nature did it all for him, so when he started to raise trees he laboured under very great disadvantages. He had seen them at home growing in poor soil, and he naturally thought they should do so anywhere. He had never seen the battle that the successful young tree had won from its enemies on every side. He did not know that the survivor was one of a thousand that had started in the race; that of the millions of seeds that fell to the earth from the trees of the forest only a small percentage germinate, and again that only a small percentage of these attain to maturity.

The prairie settler, too, coming from the east, had other difficulties to encounter in this regard. The climatic conditions were frequently unfavorable, and again he was often misinformed as to the varieties to plant, so there is, after all, little wonder that he was not successful. It was thought that here was a field where Government assistance and advice were warranted, and this is now being put into practice.

We have now noticed:

1. The tree itself and the manner of its growth and the functions it performs while growing in the distribution of moisture.
2. The value of forests in their relation to the conservation and distribution of water.
3. Their value for their wood products.

4. A very rough estimate of Canada's supply.

In closing, permit me to refer, even at the risk of repetition, to one point already touched upon, that is regarding the permanent character of forest products in comparison with mineral products, provided the forests are properly managed. Our mineral deposits being of a fixed amount, must necessarily decrease from year to year and be finally exhausted. In the forests we have, so to speak, a mine of wealth inexhaustible in character and which should continue from year to year and from century to century a source of wealth to the whole community. Do we realize the enormous value we possess in our natural resources?—In our mines, fisheries and forests, to say nothing of the potentialities of our millions of acres of virgin agricultural land, we possess an inheritance compared with which the accumulated wealth of the older countries of the world bears a poor proportion. Let no Canadian boy envy the inheritor of an old world estate, for he is heir to a greater which he is free to possess and which it should be his ambition to administer.

REPORT OF PROGRESS REGARDING A PROPOSED ACT TO BE INTRODUCED BY THE DOMINION GOVERNMENT RELATIVE TO THE SALE OF CONCENTRATED FEEDING-STUFFS.

By W. P. Gamble, Agricultural College, Guelph.

On June 6th I attended a meeting, as arranged between the Deputy Minister of Inland Revenue and Professor Zavitz, to meet Mr. McFarlane and Mr. Shutt, and to discuss with them various phases of the petitions forwarded by the Experimental Union. The majority of the committee were of the opinion that the suggestion contained in the second petition forwarded by the Union to the Department of Inland Revenue, namely, that of fixing standards to regulate the sale of concentrated feeding-stuffs, does not exactly meet the case. For, since these by-products vary widely in composition, absolute standards cannot be fixed, and an Act purporting to fix such could do nothing more than mention a minimum limit, and, therefore, various feeding-stuffs, though differing widely in natural composition, would stand on equal footing in the eye of the law, provided only that they all tested above this minimum limit. There would, therefore, be little inducement to manufacture an article of superior quality, in fact, there would be a tendency to reduce all to the minimum limit.

The question of introducing immediate legislation was also discussed. The Deputy Minister was of the opinion that legislation was desirable if sufficient evidence could be produced to combat any objections which might be raised in Parliament. He said that not only did the farmers and stockmen feel the necessity of an Act such as has been proposed, but prominent millers were anxious to have the sale of by-products wisely safeguarded. We learned, however, that the question of the adulteration was more important in the minds of the millers than that of the actual composition of the feeding-stuffs. And in this connection it may be said that we have a law, which, if enforced, would be the means of redress in all cases of adulteration of foods and feeding-stuffs.

The committee was of the opinion that though we should eventually have some law to regulate the sale of feeding-stuffs, similar in character to those in force in several of the Eastern States of the Union, yet we have not now sufficient data to guide us in the enactment of such a law. That is to say, no comprehensive, systematic examination has been made of the feeding-stuffs of the Dominion. It was suggested, therefore, that the question of legislation be laid over for the present, and that in the meantime the Inspectors of the Inland Revenue Department be instructed to collect samples from the different mills throughout the Dominion and also from the dealers; that these samples be analyzed by the chemists of the Inland Revenue Department; and that the results be published in bulletin form. Such a step, it was thought, would greatly strengthen the hands of the Government in passing such legislation as would protect both farmers and stockmen in this matter.

We were informed by Mr. Gerald that it is quite within the power of the inspectors of the Inland Revenue Department to collect samples from any source, whether it be at the factory or upon the open market. It was thought that if such samples were collected and analyzed the results would furnish sufficient data upon which to frame an Act. It may be said by some that the analyses of a great number of feeding stuffs have already been made, but it must be remembered that the analyses made of the feeding-stuffs of the Province of Ontario alone might not be considered sufficient data upon which to frame an Act which would be applicable to the whole Dominion.

In conclusion, let me say that the Deputy Minister expressed himself as being highly gratified with the stand which the Experimental Union had taken in regard to this matter. According to his statement, the recommendation forwarded by the Experimental Union was the first communication on this matter received by the Government. It is pretty fully agreed upon by all those who have given the matter any consideration, that the enactment of a law to regulate the sale of concentrated feeding-stuffs is highly desirable, and we believe that the form which would be of greatest value to stockmen and farmers in general would be that requiring manufacturers or vendors to state upon each bag or parcel the percentage of crude protein and fat, and, further, that the purchaser have the power to demand such information in cases where feeding-stuffs are sold in bulk. We also believe that it would not be practical at the present time to ask that such mill products as bran, shorts, and middlings be included under the head of concentrated feeding-stuffs, as the composition of these is fairly constant; and, further, we believe that if we should ask that these by-products be included in the Act, the passing of such Act would meet with strenuous opposition from the millers as a class, for, since there are a great number of small mills throughout the Province whose output in the way of by-products is bran, shorts, and middlings, it would be unreasonable to expect that the business of these small manufacturers would warrant the expense of the necessary analyses.

The following is a copy of a letter signed by Professor C. A. Zavitz, Secretary to the Experimental Union; F. T. Shutt, Chemist at the Central Experimental Farm, and myself, and forwarded to Mr. W. J. Gerald, Deputy Minister of the Inland Revenue Department, Ottawa, on June 17th, 1905:—

"In accordance with your desire that we should submit in writing a statement embodying our views relating to the proposed inspection and analysis of cattle-feeding stuffs, we have drawn up for your consideration the following memorandum:—

"1. It has been apparent to us for some years past that a systematic and comprehensive examination of the feeding stuffs sold in Canada is desirable. The results of such an examination published, say, annually in bulletin form, would furnish information of much value to Canadian farmers, who every year are using larger quantities of these concentrated and, comparatively speaking, expensive feeds.

"Further, the number of these feeds, produced, for the most part, as by-products in the manufacture of breakfast foods, starch, ground rice, barley, cotton seed oil, linseed oil. etc., is annually increasing, and in a large number of cases it is quite impossible to ascertain the nutritve value of the same from mere inspection.

"2. Following the examples of the greater number of the Eastern States, we think it desirable that manufacturers or vendors should be compelled to state on a tag attached to every package the net weight of the feed and the percentages of protein and fat it contains. When feed is sold in bulk the vendor should produce, on demand, a guarantee as regards the percentages of the two constituents.

"3. We do not consider it feasible or, at all events at present, desirable that wheat bran, shorts, middlings, the whole grains and meal produced by grinding any one grain should be included among those feeds to be sold under guarantee.

"4. We do not consider it practicable at present to establish a standard for the various feeds which it is desirable should be sold under guarantee.

"5. In view of the fact that two petitions (one in 1903 and in another in 1904) have been forwarded to the Dominion Government by the Executive of the Experimental Union, and in view of the further fact that the analyses of a large number of feeding-stuffs made at the Dominion Experimental Farm and at the Ontario Agricultural College indicate a wide variation in their composition, we would earnestly recommend that a comprehensive collection of the concentrated feeding stuffs of the Dominion be made at an early date, including condimental foods, linseed meals, gluten feeds, gluten meals, cotton seed meals, etc., etc. We further recommend that samples collected be analyzed, and that the results be published in bulletin form. This information would be of immense educational value, and together with the data on hand, would form an excellent basis for the further prosecution of the work."

On motion, Mr. W. P. Gamble, Hon Nelson Monteith, and Mr. T. H. Mason were reappointed a committee on this subject for the ensuing year.

THE SEED CONTROL ACT.

By G. H. Clark, B.S.A., Seeds Commissioner, Ottawa.

Two years ago this Union passed a resolution approving of the principles of the Bill respecting the inspection and sale of seeds, which was then before Parliament. At the last annual meeting I had to announce that this Bill had not become law, but I gave what assurance I could that it would be again taken up during the recent session. I am now pleased to be able to report that the Honorable the Minister of Agriculture had the support of Parliament in an endeavor to improve and pass the Act. It came into force on the 1st of September.

Some minor modifications were made in the Bill as originally introduced, with a view to simplify its provisions. The draft of the Bill that was before you two years ago was made to fit into the conditions of the seed trade as they were found to exist prior to 1903. After carrying on the work of seed investigation for a period of four years, it was believed that the Bill could be modified, to the advantage of farmers who desired the protection it would provide, and also to simplify some of the provisions in a way to make them equally acceptable to the farmer and less objectionable to the seed merchant.

The standard that is now fixed (Sec. 4) for No. 1 seed of timothy, alsike, and red clover provides for seed of much better quality in respect to noxious impurities than was provided in the Bill as first introduced. It was also found that provision could be made (Sec. 6) without seriously interfering with established trade custom, so that in effect, timothy and clover seeds produced on lands that are exceptionally foul with noxious weeds may not be retailed for seeding before being re-cleaned; and that the screenings or cleanings from timothy. alsike or red clover seeds would be prohibited from sale for seeding in Canada. In the average of years, about one-half of the clover seeds produced in the Province of Ontario is exported to foreign countries. As a rule, the demand from abroad is for seeds of superior quality. Heretofore the districts in Canada where seeds are not grown to any great extent have been a dumping ground for the cleanings of seed that was exported.

These modifications that were made to improve the Act were made possible because of the changes in the conditions of the trade in grass and clover seeds and of the far-reaching improvements that were brought about through educational work, especially through the persistent efforts of Farmers' Institute workers in all of the provinces. It is important that this educational work be not abated. The Seed Control Act may be used as a lever to stem the wholesale distribution of pernicious weeds, but the spirit and text of the Act does not aim to compel a farmer to buy pure seed. No attempt was made to prevent him from buying and using seed containing wild oats, mustard, stinkweed, sow thistle, and other weed seeds, if he so desired. The Act was intended to provide the means so that a farmer may purchase his supplies of seed intelligently. In the Act, full recognition is given to the fact that the real basis for permanent improvement is in educating the producer and user of seeds and in protecting honest seed merchants against carelessness, or design on the part of irresponsible or unscrupulous seed vendors.

A great deal has been done to demonstrate the false economy of buying inferior seeds. What is needed most now is to improve the supply. In this some very effective educational work has unwittingly been done during the last three months by reliable seed houses. Their buyers have severely discriminated against clover seeds containing noxious impurities. Much can be done through the Farmers' Institutes to disseminate information regarding the habits of weeds and the best methods of eradicating them. The increased price that farmers will get for their grain and seeds will tend to stimulate to an application of those methods.

The production of clover seeds is an important industry in the Province of Ontario and one that will stand a great deal of expansion. In respect to purity and vitality, the quality of Ontario-grown seeds has an enviable reputation in the European markets. The crop of clover seed of 1905 is of much better quality than it has been for years. If the supply can gradually be improved during the next few years, amendments may be made to the Seed Control Act in a way to provide further protection to good farmers and honest, reliable seedsmen.

The main provision of the Act prohibits from sale for the purpose of seeding any seeds of cereals. grasses, clovers or forage plants unless they are free from any seeds of the following weeds: Wild Mustard or Charlock, Tumbling Mustard. Hare's Ear Mustard, Ball Mustard. Field Pennycress or Stinkweed. Wild Oats. Bindweed, Perennial Sow Thistle, Ragweed. Great Ragweed. Purple Cockle. Cow Cockle. Orange Hawkweed or Paint Brush. and from Ergot of Rye, unless each and every receptacle, package, sack or bag containing such seeds, or a label securely attached thereto is marked in a plain and indelible manner:

(*a*) with the full name and address of the seller;

(*b*) with the name of the kind or kinds of seed;

(*c*) with the common name or names of the aforenamed weeds, the seeds of which are present in the seed sold or offered, exposed or had in possession for sale.

This, however, does not apply to the sale of seed that is grown, sold and delivered by any farmer on his own premises, for seeding by the purchaser himself, unless the purchaser of the said seed obtains from the seller at the time of the sale thereof a certificate that the said seed is supplied to him subject to the provisions of this Act.

Another section provides that no person shall sell or offer, expose or have in his possession for sale, any seeds of timothy, red clover, alsike, or any mixture containing the said seeds, in or from any receptacle, package, sack or bag upon which is marked "No. 1" or any other designation which represents such seeds as of first quality, unless they are free from the seeds of weeds named in Section 3 of this Act, and also free from the seeds of White Cockle, Night-flowering Catchfly, False Flax, Canada Thistle, Ox-eye Daisy, Curled Dock, Blue Weed, Ribgrass, Chicory, and contain out of every one hundred seeds not less than ninety-nine seeds of the kind or kinds represented, or seeds of other useful and harmless grasses and clovers, of which ninety-nine seeds ninety must be germinable.

Section 6 provides that no person shall sell, or offer, expose or have in his possession for sale, for the purpose of seeding in Canada, any seeds of timothy, alsike or red clover, or any mixture containing the said seeds, if the seeds of the weeds named in sections 3 and 4 of this Act are present in a greater proportion than five to one thousand of the seed sold or offered, exposed or held in possession for sale.

A clause is also inserted allowing a margin of tolerance in any seeds sold under the Act so that their character may not be affected as being within the meaning of the Act, free from the seeds of the weeds named. This margin of tolerance is made necessary, because of the natural variation there may be in the purity and vitality of samples of seeds taken from the same bulk lot. It is inserted primarily to protect seed merchants who make an honest endeavor to conform to the spirit and text of the Act.

Copies of the Seed Control Act may be had on application to the Seed Commissioner, Department of Agriculture, Ottawa.

BEST METHODS OF IMPROVING THE PASTURE LANDS OF ONTARIO.

By J. Buchanan, B.S.A., Lecturer in Field Husbandry, O.A.C., Guelph.

I shall confine my remarks to a few suggestions which will, I hope, facilitate the discussion of this important subject. I take it that the subject includes the improvement, first, of short rotation pastures, and, second, of permanent pastures. All will, I think, admit that the usual mixture of clover and timothy is not all that could be desired. Timothy gives a good yield of hay, but the pasture following the hay crop is not sufficiently abundant, particularly in unfavorable seasons. Many farmers in the adjoining States are substituting Orchard grass for timothy. Either this or Tall Oat grass will furnish a better pasture mixture with clover than will timothy. In some respects they are better for hay, as well as pasture. Either of these grasses will mature with clover for cutting as hay, while timothy is too late. Some object to Orchard grass for pasturing because it grows coarse as it heads out, but this may be overcome by running the mower over the field. Cattle should not be allowed to stay on the pastures too late in the autumn nor turned on too early in the spring. Poor pasture is often the result of careless handling in this respect. Sometimes cattle are allowed to eat the pasture too bare in the fall; this results in the grass making a poor start the following spring. In the same way an unsatisfactory condition will follow if, because of scarcity of feed, cattle are turned upon the pasture before it has had a chance to make satisfactory growth in the spring. It should be borne in mind that the roots of the plant are dependent on the top and the leaves just as much as the leaves are dependent on the roots, and you cannot have a satisfactory growth of one without the other. On the other hand, if grass is allowed to grow too tall and rank in the spring before the cattle are turned on the pasture, they will not be able to keep it eaten off and much of the crop will go to waste.

As to the improvement of permanent pastures on rough land that cannot well be cultivated on account of the presence of stones, or for some other reason, it is probable that certain grasses, such as Couch grass, which are objectionable in other places, might be turned to good account. Couch grass is a strong grower, spreads rapidly, is well suited to light soils, and my observation is that cattle like it. Awnless Brome Grass might also be used to good advantage on such lands.

It is a question whether grass seed can be sown on wild land to advantage without a certain amount of preparation. Our experiments in sowing grass seed on old sod without any cultivation have not shown that any material improvement took place. If the land can be broken, or roughly cultivated, much better results will be seen. If the land is too rough to plow, the surface should be stirred as much as possible by using some suitable implement so as to give the seed a chance to germinate.

Thomas Ingalls, Bruce County: From an experience with permanent pastures lasting over thirty years, I believe that they may be made self-sustaining in this Province, provided they are properly manured. Run-down land which will not take a catch of grass should be brought into seeding condition by manuring. Once in grass, if properly cared for, the crop of pasture should prove continuous and the land steadily improve in condition. After the seed has been sown I would not let a hoof on it the first year and would pasture but moderately during the second season. In all seasons there should be a thick mat of grass for the snow to fall on.

Q. What grasses do you like?

Mr. Ingalls: I seeded down originally with clover and timothy, but June grass has gradually crept in. I have also used considerable Orchard grass. In one dry year I let this grass get the start of me before pasturing. When it was cut in June, it provided one load per acre and during the balance of the season this was the only green field in the neighborhood.

Prof. Stone: At our Station two years ago we started a pasture on forty acres as an experiment. This pasture was divided into strips, each being sown with different varieties or combinations. The experiment has not continued long enough for us to reach definite conclusions. One strip was sown with Brome grass. This we regarded unfavorably at first. It is coarse in the leaf, and though valuable in the West, we did not think it would give superior results with us. We were surprised to find, however, that, when the stock were turned into the field, they showed a preference for this grass above all others and continued to do so all through the season. We are inclined, therefore, to regard the variety as a very promising one.

Q. Have you had any experience in reseeding old meadows?

Prof. **Stone**: This has been done very successfully in our district without breaking up the land, by sowing fresh seed in the early spring. In one case a pasture of thirty years' standing on sandy or gravelly soil was renewed in this way. I may say, in fact, that the practice is quite general among farmers in New York State. It is better to top-dress with manure and use a harrow to stir the soil, but this is not essential. If seeding is done while the soil is moist and this is succeeded by a dry spell, failure will likely result, but seeding just before a moist spell is almost certain to be a success. I have seen the value of old pastures doubled in this way. We find that a top-dressing of lime will often materially help a pasture. This also is very useful in bringing in white clover.

Hon. Nelson Monteith: The question under discussion is one that is of great importance to us as farmers. Profiting by the lessons taught by Prof. Brown while I was a student at the College, on my return to the farm I put some of my rough land in permanent pasture, using Meadow Fescue and Black Medick and I think one of the small clovers. These grasses are still thrifty, although they were laid down fifteen years ago. Of course differences in soil have to be borne in mind in considering varieties, and one has to experiment for himself in this connection. Orchard grass is another useful variety in a mixture. It is on most soils a very vigorous grower. If allowed free scope, it is apt to become a weed, and it is difficult to eradicate, especially around fence corners. It should never be allowed to grow too rank before pasturing. Much of our rough land will pay better if maintained in pasture than in any other way. In this connection Lucerne is very successful on many soils. The matter of top-dressing pasture land is too often overlooked. On bare uplands and hillsides, it will help very materially.

Mr. **Ingalls**: It is well enough to put rough land in pasture but the best land will make the best permanent pasture.

Prof. **Zavitz**: I find from the report of the Bureau of Industries that the amount of land in pasture in Ontario has increased in about five years from two and a half million acres to three million two hundred thousand acres. This shows that there is a strong tendency at the present time to increase the amount of land in pasture. At the same time I do not think that our pastures are improving very much. We still depend on timothy and clover. After the first year, because of the scarcity of labor, the land is frequently allowed to remain in timothy. After a time a dry season comes along and the results are small indeed. Some of these other varieties will remain fresh and green in a hot dry time in summer long after timothy is burned up. Whatever pastures we have we should aim to make them just as good as possible and there is certainly room for great improvement.

W. S. **Fraser**: It appears to me that it is a question well worth considering, especially in view of the great increase in pasture, whether it is profitable to put good land in permanent pasture or not. I agree with all that has been said, however, as to the importance of improving the quality of land that can be used to advantage only as pasture land, but we must not overlook the fact that some of our best agricultural land is being made use of in this way. I was told by a grazer in Oxford County that he counted on two acres of pasture to a bullock,—three if necessary. Even if a bullock gains 150 pounds in a summer's feeding and the gain is worth 5 cents per pound, what does it amount to? It is poor return for land which should produce crops worth $25 to $50 an acre. Timothy is the least desirable of any of our grasses. It takes more out of the land and puts less on the steer than any other variety. Clover is not permanent. Alfalfa is very useful as a permanent pasture on hill sides, where it can be successfully grown. It will give three times the yield of any combination of grasses and has great feeding value. If we have permanent pastures, we should endeavor to get the best possible results from them; they should be really permanent and should grow continuously throughout the season. Where Alfalfa will succeed, it certainly has much to recommend it.

ADVISABILITY OF HAVING A GOOD FARMS COMPETITION IN ONTARIO.

By H. B. Cowan, Superintendent of Fairs, Toronto.

This is a subject which I have had under consideration for a number of years and the conclusion I have formed is that if a good farms competition on broad lines could be inaugurated by the Department of Agriculture, it would accomplish more good than any other line of work that could be undertaken. The Agricultural College, the Experimental Union, Farmers' Institutes and other agencies of that kind do a grand work in supplying the demand for information which is so evident to-day among the farming classes, but I think they fall a little short of obtaining ideal results. Many farmers even scoff at the information obtained in this way. The only way to reach that class of persons is by an object lesson right at their doors,—by showing them a neighbor who, starting out under the same conditions as their own, has made a success of his farming operations, and by pointing out the reasons for his success.

I was first impressed with the advantages to be derived from a competition of this kind when on the staff of the Ottawa Valley Journal. I had occasion to visit the farms of Pontiac County in the Province of Quebec. One farmer invited me to stay over night, and the first thing he showed me in his house was the diploma and medals he had won in such a competition some years before. It was evident that he was more proud of this than anything else he had accomplished, because the diploma stated that he was the second best farmer in the county. At the time of my visit he was working hard with the idea of competing for first place in the next competition. He informed me of the large number of persons who visited his farm and asked him about his methods.

In holding such a competition here, a number of difficulties at once present themselves. First, there is the question of rented farms. A considerable number of farmers do not own their own farms and it would be unfair to them if points were offered for the best buildings, because they would not be justified in expending much money on buildings that did not belong to them. It might, therefore, be desirable to make a special class for them. Another difficulty would be in dealing with the farms owned by men of wealth, who had acquired their money in other lines of business and had unlimited means to expend on their farms. This might be met by confining the competition to those who made their living on the farm. The question of the size of the farm, how long it had been cleared, etc., would also have to be taken into account. A class might also be made for those who make a specialty of fruit and vegetable growing. In Quebec for example, they have a class for market gardening. I do not think that these difficulties are serious objections if the project is approached in the right manner.

There is no competition which is absolutely fair to all contestants. If we once accept that fact, it should not be difficult to provide a plan which would be in the interests of the greatest number.

The next question that arises is what should be included in the competition? I should say, everything, from the appearance of the house to the condition of the fences in the remotest corner of the farm. The profits derived from the farm should be taken into account. The prize should not go to a man who simply decorates his farm out of proportion to its capabilities in this regard. In all such matters common sense should rule. Arrangements should be made to give every possible assistance to the contestants in the way of information. In Quebec, where contests of this kind have been held for many years, a handbook is issued which gives information and explanations as to the various subdivisions and regarding the points on which the judges will base their awards. Such a book might contain information on the various methods of farming, the preservation of the farm woodlot, methods of farm bookkeeping, and points might be awarded in the contest for excellence in these departments.

In my opinion the proper agency for conducting these competitions is the Agricultural Societies. Competitions of this kind come well within the objects of such societies. If they offer prizes for the products of the farm, why should they not go farther and give prizes for the best managed farms. Too often the prizes offered by societies go to specialists, and the most successful farmers do not enter their products. The Province grants to these societies a total of $75,000 a year. If they could be induced to devote say $5,000 annually to this work, it would greatly increase their usefulness to the Province. The society at North Bay took up work of this kind this year. There were thirteen entries and the President speaks enthusiastically of the results.

I have taken the matter up with a number of those who engaged in the competitions held in the Province, as most of you know, a number of years ago, and find that they are enthusiastic on the subject. Mr. Simpson Rennie was first brought into prominence when his farm won the prize in a contest held twenty years ago. People to-day are still visiting that farm. Two years ago, when I was in the United States, I saw in one of the leading agricultural journals, a full description of that farm illustrated by photographs of the buildings. It is probable that nearly all of you know of farms in your county that won in these competitions. There are doubtless many men in the Province of whom we do not know, who are conducting their farms with the greatest success. Our object should be to learn of these men, discover the reasons for their success, and present this information to the farmers. If one hundred such farmers could be discovered and the facts presented in this way, it would result in great good to the agriculture of the Province.

T. H. Mason: The question of labor, it appears to me, would have an important bearing on this subject. I think the prize winners in such a competition would be found to be those who had a large supply of farm labor at home. This would apply particularly in the German sections and perhaps in the Ottawa River Valley. If anything could be done in this line without involving too much outlay, I think it would be well worthy of the attention of the authorities.

R. F. Holtermann: If this Province is to be justified in taking up a line of competitive work in farming operations, the thing must be done in a way that will prove of general value to the farmers. Practical demonstration is called for in these days, and therefore I believe that this is a right and proper work to be taken up. I am not an authority on general agriculture, but in my own particular line I think I can speak with some authority. I am in favor of the specialist in farming and think that every farm should be so run that there would be one special department, and every other branch made subservient to that department. More than that, I believe that there should be more co-operative farming. Certain sections of this Province are adapted to special lines of agriculture. These are the lines that should be taken up in those districts and the farmers there should unite their interests and specialize on those lines. If we are to advance, we must, to a large extent, get our information from specialists. I should favor the plan of taking special departments of the farm for competition and give an award to the man who is most successful in that particular department and can demonstrate its possibilities to the highest extent.

L. H. Newman: The question, it seems to me, is not whether such a competition is possible or even is feasible, but whether the end to be gained will justify the expenditure of public money. Our Farmers' Institutes and Agricultural Societies, and other agencies that could be named, have had an important influence on the agriculture of this Province. The success of such organizations depends on the extent to which their teachings are put into practice. It is one thing to tell people what they should do, and quite another thing to induce them to do it. I think the time is ripe when something more should be done to elevate our agriculture to a better tone, and that the suggestion made by Mr. Cowan, if put into effect, would be a step in the right direction.

C. C. James, Deputy Minister of Agriculture: It would seem from listening to the previous speakers that all here are prepared to endorse Mr. Cowan's suggestion. It appears to me that more interest and instruction would be gained if, in discussing matters of this kind, one of the speakers should present arguments on the other side of the question so as to bring out its weak points. If you could bring out the other side early in the discussion, I think the subject could be much more profitably considered. The United States Department of Agriculture is seeking to accomplish the results suggested by previous speakers in a somewhat different manner. When they discover a man whose efforts are meeting with uncommon success in any line of farming operation, they go to him and obtain all the information possible as to his conditions and methods. They then select various sections where they believe this particular line of work could be successfully duplicated. They select a suitable farmer in that district and arrange that he shall conduct his farm precisely as they may direct, guaranteeing him against any loss in so doing. In this way they put into operation the methods that have been so successful elsewhere, and this farm soon becomes an example for the district. This plan, it seems to me, has more to commend it than a good farm competition would have, and would accomplish all that Mr. Cowan hopes to see accomplished by such a competition. The present Agriculture and Arts Act already empowers agricultural societies to award prizes not merely for the products of the farm, but to crops as they are being produced on the farm, and also for methods of farm management. Would it not be better to work upon that line and induce agricultural societies to award prizes for growing crops and for farming operations, gradually extending that idea until, eventually, it would embrace the whole operations of the farm. Because these farm competitions are accomplishing good results in Quebec, it does not necessarily follow that they would accomplish equally good results in this Province. Social conditions and modes of life in Quebec Province are so different from those that obtain here, that different methods are required there in order to reach the farmers. For similar reasons the Farmers' Institute is much more effective here than in the Province of Quebec. We must accommodate our work to the people and their peculiarities. Object lessons have been found very effective in Quebec; they are doubtless effective here, but not, I think, equally so.

MODIFICATIONS IN SHORTHORN TYPE.

By Hon. John Dryden, Toronto.

No one in this audience regrets more than I do the absence of Prof. W. M. Hays, the Assistant Secretary of Agriculture at Washington, who was to address you this afternoon on the subject of the improvement of plants and animals. If he were here, he would tell you that the principles underlying the improvement of plant life are exactly similar to those which govern the improvement in the types of farm animals, and I looked forward with a great deal of pleasure to being permitted to hear what he had to say on the subject. We are coming to a time when a great deal of new information will be available to those engaged in this work. Some, like myself, will probably not live to see the result of this, but these young men will see a great deal of improvement in the character of animals and plants, and I almost envy them the opportunities they will have in this regard. The work in the future will be more pleasant and more profitable than it has been in the past.

The subject I have elected to speak to you upon is the modification of Shorthorn type. I was born in the year 1840, which was about five years after the first Shorthorns were brought into this Province, which, I think was about the year 1835 or 1836. Since that day, there has been a great deal of change in the type of these animals. In those days Shorthorns were not all of the same type, nor are they so to-day. If you go from one man's stables to another's, you will find that there is a good deal of difference; but in those early days, there was a considerably greater variation than at the present time. To-day, the best breeders the world over have practically the same ideal in mind. They may not tell it to you in the same way, but I venture to say that the men who are doing the best work in this business, whether in Scotland, Canada, or the United States, have pretty much the same ideals before them. This cannot be said of the first breeders of Shorthorns. They did not agree as to the ideal type. Mr. Bates, out of what he found at his command, undertook to produce what he considered to be an improvement on the animals with which he found himself surrounded. Mr. Booth, with a similar idea in view, had before him a different ideal to that of Mr. Bates; so that you had in those days, when this so called improvement began to be made, three different types, or perhaps, two distinct native types, and a third, which represented the efforts of those engaged in carrying on this improvement. All these types perhaps had something to commend them, although probably none of them would be accepted now as the ideal. This is not because they were not useful cattle then; nor is it because they were not admired then by those who knew their business, but because of the changed circumstances under which we live. If there has been a change of type, there has been a very good reason for making this change.

All these types had some characteristics in common. All had, for example, very wide hips, which is exactly the opposite of what we desire to-day. I have seen judges measuring cows across the hips with a cane and awarding the prize to the one with the widest hips. Fancy a judge doing that to-day; he would be run out of the show ring in short order. Then they all had a rather bare, rough shoulder as compared with what we now have. When the type was changed, the effort was to cover up these bones, both on the shoulder and on the hips. A third characteristic was length of legs, which is one that survives in many animals to-day.

As between the Bates and the Booth types there was some difference in color; Mr. Bates favoring darker colors, while in the Booth cattle you will find a great many more whites and light roans. The Bates cows were, I think, as a rule the better milkers, had finer heads, and were somewhat less in weight; but they were rather handsome, and the male animals had a great deal of "style," of much the same kind as you would see in a driving horse. We no longer regard that as desirable, and, in this regard, my contention always was that I did not intend to put harness on the animal and drive it in the buggy. Style does not mean anything real or useful. The Booth cattle were inclined to be larger, and while poor in appearance when young, they were very smooth and handsome at maturity. If you ever saw a herd of fully matured Booth cows in pasture, you would have had to admit that you never saw anything handsomer in the way of Shorthorns. They presented all the characteristics we now like to see, but the difficulty with them was that the more they were fed, the less flesh they produced and the more tallow. This was not considered to be undesirable at that time, and for this there was a reason. In those days tallow was worth a great deal more than the flesh; therefore the butcher was delighted when he killed an animal that turned out to have a great deal of tallow in the carcass. To-day, with electric light and gas, we do not use candles as we did in my early days. These conditions have passed away, and for this and various other reasons, tallow is of low value to-day. The demand is now for flesh, and the breeders of these animals want to have as little tallow as possible. Therefore, the necessity for changing the type. Mr. Booth's cattle, when they were one and a half to two years of age, were leggy in appearance and rather thin—absolutely unfinished looking in appearance. When they developed and loaded on the tallow, they became very handsome animals.

Comparing these types with what we have to-day, we find that they were much slower growers and therefore took much longer to mature. If you asked me to state as between the Booth and Bates cattle, which, in my judgment, had the most real merit, I should not hesitate to say that the Bates had at that time; I mean the Bates cattle of that day, not the Bates cattle of the present time. In later years, the good characteristics of the Bates cattle were almost entirely lost because the men who handled them ran away on what I call the "pedigree fad." Some of you young men may have read my article on "Fads in Breeding," in which I refer to this subject. The men who were breeding these cattle in former days ran them aground on this fad. They were not breeding cattle: they were breeding pedigree, and they cared nothing about what the cattle were in themselves. In my judgment, good breeding means good cattle, and not merely a fashionable pedigree. A breeder of these cattle once said to me: "I find it so much more pleasant to breed Bates Shorthorns than any others." In reply to my question as to why that was, he said, "I do not have to write to a customer, who lives perhaps a hundred miles away, to come to my farm to see an animal he is thinking of purchasing; I send him the *printed pedigree*, and if the pedigree is all right, the sale goes through, and I can sell my animals as fast as I can produce them." But they did not keep that up for many years. The result of this was that the Bates cattle are now in the class of "has-beens," If you could attend some of the sales of Shorthorns which take place in the United States, you would wonder why it is that the prices paid are so much higher at one sale than at another. If you examine into the reason, you would find that these low priced animals are the pedigreed Bates' cattle.

The present ideal Shorthorn is, in my judgment, due largely to the work of one single individual. Just as Booth developed his type of cattle and Bates developed his, so there arose in the north of Scotland a very quiet, unassuming man named Amos Cruickshank, who had the courage to strike out on new lines and the intuition necessary to guide him to new results. His idea was to produce a type of animal that would be of greater benefit to those living around him—a "rent-payer," as he called it. He had no thought of making a name for himself, for no one in Scotland had less idea that his name would go down to posterity. He had the intuition necessary, as I have said, for work of this kind: that is to say, he knew what he wanted, and he had the ability to recognize it when he saw it in an animal. It took him a long time sometimes to make up his mind but, as Mr. Duthie says, you might rest assured when he made up his mind, he had looked over everything there was to see, and had gone into the matter absolutely, and therefore made no mistake. When he saw as a calf that most noted of Shorthorns, "Champion of England," he recognized at once that there was the animal he required for his purpose. By what means, you may ask, could be tell how this calf was going to turn out? Let me say that if you young men can but learn how to determine this, I will guarantee you success as breeders of cattle. It was "Champion of England" that made his herd what it finally became. Mr. Cruickshank's idea was to produce a quick growing and easy feeding animal—an animal with thicker flesh and less tallow; an animal with the bones covered up; an animal that would meet the demand of that day; and I need hardly say that it still meets the demand. The consumer demands less fat, more lean meat of a tender juicy character, and desires it at a younger age. Mr. Cruickshank undertook to produce an animal that would meet these requirements.

In reply to an inquiry I once made of him as to how he could distinguish between flesh and fat in the live animal, he stated that he could always tell in his own cattle but that he could not always determine it in another man's. He was able to do this because he knew how his own cattle were brought up, what feed they consumed, and which families produced most flesh in proportion to their consuming capacity.

As I have pointed out, changes were made in the past to meet changing conditions, and are likely to be made in the future as the process of adaptation goes on. The past should teach us some valuable lessons if we are prepared to take warning by them. I hear a good deal of talk about certain "families" of Shorthorns in these days. Let me say that if the reputation of a family is based merely on the fact that one or two noted animals appear near the bottom of a long pedigree, and if since their day little attention has been paid to maintaining the excellencies those animals exhibited, the pedigree is to-day of little value, and the family name signifies nothing, as the influence of the animals on which the family was founded has long since ceased. It is the animals near the top of a pedigree that count, and these have the prevailing influence on the offspring. Let us keep to real things,—things that count. Do not make the mistake of choosing a pedigree with a particular family name attached to it unless there is something beyond that in the way of merit. If all the way through a pedigree from the start, the names of animals of great excellence appear, you may be sure that these good points have become fixed and that the pedigree is all right; but if the animal has lost its usefulness, let that family go and let us have something real and useful. If you will bear these things in mind, some of you young men will be able to improve very much on the types of cattle we have to-day.

Q. Would you cast aside an animal because of its color?

Mr. Dryden: Personally, I would not; but you see the position. If I have too many white animals in my herd, I cannot dispose of them, and the financial aspect has to be considered. Whatever my own opinion may be, I have to be guided more or less by the wishes of my customers: but there is no real reason why you should consider a white animal as inferior on account of its color.

Q. I was discussing the matter of color with a breeder at the Toronto Exhibition and I asked him if he had any preferences as to color. He said, "No, I am a Shorthorn breeder."

Mr. Dryden: I do not know exactly what he meant by that. We have to admit that the color of the Shorthorn always was and is, red, white, and a mixture of the two. If I had my way, I would have all my Shorthorns a red-roan as a matter of preference. In my herd to-day, the prevailing color is red. It suits my customers, and the cattle are just as good as cattle of any other color so far as I know.

Q. Is there any real objections to red-and-white?

A. There is no real objection, except that their appearance is not so handsome, but the hide will make just as good leather.

Q. How is it that animals belonging to certain families bring such high prices at some of these sales alongside of other animals equally as good but not belonging to these noted families?

Mr. Dryden: I can answer that in two ways. First, the animal which brings the highest price belongs to what is called a fashionable family. For instance at Mr. Flatt's recent sale, there were included eight females belonging to the Lavender family, which originated in Mr. Cruickshank's herd. The average price for the eight was about $875, the highest bringing $1,600. Nothing else in the sale reached anything like that figure. Why was this? I will tell you what I think about it. I think there was actually more merit in the representatives of that family compared with the other animals offered. This was doubtless recognized by others besides myself. But I think that with the majority, it was merely a question of fashionable pedigree—a question of which pedigree would secure the most buyers in years to come—and, on that account, they paid more money for these animals.

Q. If like produces like and you breed along one line of color for generations, would you not produce what you set out for?

Mr. Dryden: Yes, you might, if you started with a red cow and had red for ten generations, but, of course, the breeding of the sire would have to be taken into consideration.

Q. Is it not true that the foundation stock of the Shorthorns was a white animal?

A. I can not state positively as to that but they were light in color.

Q. What is your opinion of the milking quality of Shorthorns to-day as compared with what it used to be?

Mr. **Dryden**: The Bates' cattle in a general way were always better milkers than the Booth. Mr. Cruickshank in the early days paid great attention to milking qualities. If his cows were poor milkers, no matter what they looked like, they were discarded and set to the butcher. Any number of splendid animals were sent away in those early years because of that defect. When I was there, nearly all his cows were good milkers; but there arose a time when his cattle were in such demand that he could not keep up this process of selection. There also arose a time when the demand was insistent for animals that were all red in color, and Mr. Cruickshank, much against his will, was compelled to refrain from using animals he would like to have used because the color did not suit his customers. That was the first retrograde step with these cattle. That he did well all must admit, but it seems clear that new blood should have been introduced before he parted with these cattle, because every one would have taken his judgment in the matter where they will not now take yours or mine.

Q. Do you think it was a mistake losing sight of the milking qualities from a beef standpoint?

Mr. **Dryden**: Yes. What I think about the general purpose cow is this: if you have a class of animal that will produce good beef and lots of milk at the same time, they are certainly more valuable than animals which produce only the one or the other. The greatest curse we have in Ontario in connection with the beef cattle industry is the fact that we have been mixing up the beef and dairy breeds until something has resulted which is fit neither for beef or milk. I am ashamed to say that to-day over in Great Britain we have often to accept the lowest price when we can produce the finest beef in the world. The poorest New Zealand beef, which will not classify in any other way, is sold there as Canadian, and this state of affairs, I submit, has been brought about by crossing the beef and dairy breeds.

THE PROGRESS OF THE O. A. C. DURING 1905.

By G. C. Creelman, President, Agricultural College, Guelph.

Ladies and Gentlemen,—Once a year it is our pleasure to meet in this hall and renew old acquaintances. We have met here to-night on a peculiarly auspicious occasion, because I have on my right hand our Minister of Agriculture, a graduate of this College, and on my left the late Minister of Agriculture, who did so much during his time to develop the best interests of this institution.

I promise you that the speeches to-night will be bright, witty and clever because of the names that I see on the program before me. I feel it my duty to say one or two things with regard to the developments which have taken place since we met here last. When I say developments, I mean just what I say, because while attendance alone at an institution of any kind does not necessarily stand for great progress, and does not in itself indicate the nature of the work undertaken, yet in an institution of this kind, the only one of its kind in this great agricultural Province, a constant, steady increase in attendance indicates an increase of appreciation on the part of the people of that Province. And while I say that, during the last eleven months of this year there were enrolled in the general course of agriculture 336, in special courses in agriculture 13, in the dairy course 78, in the stock judging course 203, in the short course in poultry 16, at the

Macdonald Institute in domestic science and domestic art 215, in nature study 127, in manual training 16, we have a grand total of 1,004 students who have attended this institution during the last eleven months. The boys have come largely from the farms of the Province of Ontario. It was not always so, but now increasingly each year we are getting not only the patronage but the confidence of the individual farmers themselves, and as they used to prepare one boy to go into the ministry, one into medicine or law, there is now in many farm homes, one boy, and I may say here it is not the dullest boy, picked out to be sent to the Ontario Agricultural College. Last year it was my privilege to accompany the graduates of this College to Toronto University Convocation, and as those twenty-seven bright fellows came up on the platform one after the other and passed before the Chancellor, my heart swelled with pride as I looked at those young men who had passed through this College. And so it pleases me very much to state that the great majority of the students who attended this institution from year to year, and particularly during 1905, have come from the farms of Ontario. From the other Provinces we have had 39 students, each Province in the Dominion of Canada being represented in that number. We have had one or more students from the following countries. Argentina, Australia, Belgium, England, France, Jamaica, Japan, Jersey Island, Newfoundland, New Zealand, Orange River Colony, Panama, Switzerland, Spain, from Scotland, from the United States of America, and from Uruguay.

On occasions of congratulations of this kind there are always some words of sadness to be said, and I feel it is only my duty to refer to three men who have left us from the College staff during the past year. Prof. Harrison and Prof. Lochhead, go to St. Anne's to the new Agricultural College being established by Sir William Macdonald near the City of Montreal. It is a compliment to this Institution when Dr. Robertson and Sir William Macdonald have come to our staff and chosen two of our well-tried professors. I must also refer to Mr. Melville Cumming, who was selected by the people of his own Province to go back to Nova Scotia as President of the Agricultural College for that Province. We regret that these gentlemen have had to sever their connection with us, and wish them God-speed in their new field of work.

We have also made additions to our staff and to some of the departments of our institution. A new department of Entomology and Zoology has been created. The old students will remember that we had one professor in 1885 who taught zoology, entomology, chemistry, horticulture and biology and all the other sciences included in that list, and now we are dividing it and dividing it up until we find that the department of biology did not mean anything, being so broad that one man was not able to devote time to any one special branch of that science, and we had to go all the way to North Carolina, one of the banner States of that galaxy of Southern States,—we went down to North Carolina and got a man, Mr. Franklin Sherman, who comes to us with the best of recommendations. We have a new man in the department of Animal Husbandry,—Mr. Arkell, who, as they say, was brought up in the pen. I mean to say, that coming here as the Assistant in Animal Husbandry, he is a man who has learned his business from the ground up, has shown sheep at the Exhibition in Toronto for years and years, and it is said by a good many students that what Mr. Arkell doesn't know about sheep Prof. Day does. We have added a Professor of Nature Study, Prof. McCready. A Department of Forestry has been instituted. Mr. E. J. Zavitz is the Lecturer in this work. Prof. Edwards comes to us from the Agricultural College at Michigan, after which this Institution in its early days was very much fashioned, because in those days it was supposed to be the best on the continent. We went there and chose Prof. Edwards, who has now assumed charge of the Department of Bacteriology. We are adding new men and adding new Departments. One other department I must mention, and that is the department presided over by Prof. Evans. His department has grown more than the number of students taking that course would indicate, because Prof. Evans is endeavoring to introduce the principles of manual training in all the departments of Macdonald Institute. No class of teachers go there without passing through the hands of Prof. Evans, where they may get more ideas which will help them to be handier with their hands and quicker with their eyes and brains. Prof. Evans' work piled up to such an extent that we were obliged to supply him with an assistant, Mr. Kendall. Our new Mechanics Building is now in process of construction, and when Mr. Evans and Mr. Kendall move into it we expect to have a very, very important and a very interesting and instructive department launched in this College in the handling of agricultural machinery and the making of simple tools, and in blacksmithing and forging.

I cannot leave this department without mentioning the work that is being done at Macdonald Hall and Macdonald Institute. Mrs. Fuller is with us again to-night, the mother of the girls in Macdonald Hall. It is not necessary to say anything more in reference to that. Who could take so well the place of the mothers of the girls, who could not come with them, as Mrs. Fuller? We have lost one or two of our teachers. Their places have been supplied by Miss Greenwood and Miss Speller.

In the way of buildings I would mention the new houses erected this year for our farm foreman, the foreman of the Experimental department, and four teamsters.

We believe by making our men comfortable and close at hand; it will go a long way to making the work of the outside departments run very much smoother than in the past. We are asking for additions next year. Four or five things in particular are needed, and I say this now in the presence of the Minister of Agriculture. He will get us everything he can, but there are other Ministers of Departments, and it is not always easy for the Minister of Agriculture to get all the money he would like. We want an addition to the Chemical Laboratory; we want new glass houses for the department of Entomology and Physics, we need a new laundry and we need an addition to the College dormitory. I am sure that will appeal to the students, who feel themselves so much crowded. (Cheers). I should like to see the time in the not distant future when the present dormitory may be employed for the accommodation of just half the number of students who are there now, one student to each room. I assure the Minister of Agriculture that any addition he can make to the College dormitory will be appreciated by each and every one of the students.

THE ONTARIO DEPARTMENT OF AGRICULTURE.

By Hon. Nelson Monteith, Toronto.

I am sure after listening to the address of your honored President referring to the needs of this College there is little that I can really add. However, I think I am not letting you into any Government secrets when I tell you that it is the desire of the powers-that-be at Toronto to make, if possible, this institution still more efficient. Much has been accomplished. Honor to those to whom honor is due! We have with us here to-night in the person of Mr. Dryden, who has been the head of the Department of Agriculture for so many years, the man who has brought about the results at this institution. I remember well the students of the days gone by, when other rulers ruled; when Mr. Drury, of honored name, held that important portfolio of Agriculture. This institution at that time was struggling against, very often, unfair criticism; criticism that did a great deal of injury and retarded the beneficial results that should have flowed from this College. About the time I had the pleasure of leaving this institution as a graduate, Mr. Dryden took hold of the Department of Agriculture; and with his great helper, Dr. Mills, who I am sorry is not with us to-night, worked hard for the up-building of this institution, and we have it to-day with a reputation far exceeding the bounds of the Dominion of Canada. It is with a feeling of pride that I can tell you that during my sojourn this past autumn in the western country of Manitoba I found a graduate of this institution who had been appointed to the important office of President of the Manitoba Agricultural College, in the person of Mr. Black, whom many of you know. Mr. Black has brought honor to this institution as a writer on the staff of one of the agricultural papers of the West, and by filling the important position of Deputy-Minister of Agriculture, and he has now been appointed President of the Agricultural College of the Province of Manitoba, wherein he can mould to a great extent the agricultural thought of that western Province. This, to my mind, is the kind of work our students are so well fitted to do. We have with us to-night Mr. Cumming, who has gone back to his native Province to build along the lines of thought brought to him through this institution. This is the kind of work we are proud to believe is going on in every locality, in a minor way. I believe the most lasting results must come largely from the men who go from these halls back to their own localities, where they have been reared, and there exemplify the great truths of agriculture as taught at this College. They are not to stop there, and merely exemplify the scientific training, they are to go further and enter into the full duties of citizenship, and take their part in the affairs of the localities, and therein assist in moulding the opinion of the whole country as far as in them lies according to the ideals so well taught here. I do not know that I shall make any extended remarks along the lines the Department of Agriculture proposes to follow. That is something that, as a rule, is given very serious consideration, and for that reason I think you will pardon me for not only my assumed modesty, but also for my own well-known modesty, in not declaring any policy along advanced movements regarding this College. We realize the needs of the various departments, and know something will be attempted in extending the work along the dairying line. Then we have what we might call the outlying work of the experimental stations in the different parts of the Province. In fact I may almost tell you in confidence that the Horticulturists at their last meeting in Toronto gave us a bill of fare almost sufficient to engage our attention for the next twelve months, and they, no doubt, are only one of the organizations that are bound to come and tell us of their woes and wants. These are the kind of things we meet from day to day, and I can assure you that when your President and staff come to us in the making up of their estimates, we shall endeavor to be as liberal as the large surplus on hand in this Province will permit. They tell us they are finding silver in chunks away up in Cobalt.

What we will do with those chunks we are not very sure yet. Whether they are going to give them for the development of the agricultural resources of that country or not, I am not in the secret. That country which was discovered by the late Government we are going to try to develop to some extent, and there is no doubt that when Niagara's power is developed and utilized for the manufacturing interests of this great Province of ours, and possibly the smelting of our ores, that in those days, when the surplus will roll into the treasury, it will justify us in making those improvements which I believe are possible at this great institution. When that time comes, we shall assemble almost in thousands at annual events of this kind to pay our homage to the great calling of agriculture. I thank you for listening to me so kindly, and I trust it will be our privilege to meet on future occasions.

THE EX-STUDENTS OF THE O.A.C.

By Hon. John Dryden, Toronto.

I desire to take this opportunity of congratulating the Minister of Agriculture on the good start he has made in the Department of Agriculture. He has copied,—and he will not mind if I say he has copied—but he has copied a phrase which I wish he would drop right away. He seems to think everything is accomplished when he has taken everything which you propose into his "serious consideration." We have all heard the phrase over and over again. The fact is there is nothing which you can ask from this institution which should not receive a prompt answer from my friend. He has been "seriously considering it for years; so have I. We want prompt action here, because you and I are living now, and we want something done now, and I am sure the Minister, when he begins to think of it, will agree with me whether he says so or not. Let me say that I have sat at this table a good many times as head of the Department of Agriculture in this Province. It is an honored position. I am sitting on the left side now, and not on the right side, and yet I want to say that I was never prouder in my life, sitting on the right hand of the chairman as Minister of Agriculture, than I am this moment in being asked to speak on the subject allotted to me. The ex-students represent the product of this institution, and if there is an institution in this country which is turning out students who are going to make their mark in this Canada of ours, it is the O.A.C. I did not know until I came to the institution this afternoon that I should be asked to speak this evening, but the subject was so attractive that I could not help but stay, and so I am here.

What a noble band they are, the ex-students of this institution. They represent among other things high attainment in agricultural education and strength of character. This institution develops manly character and manly ideas. It represents also the best. Wherever these men are, they will represent the best Canadian sentiment of this country. We have seen these men practically all over the world, and I have never yet felt that I need be ashamed of the product of this institution. Wherever you find them, I venture to say, you will find them, not drones, but workers. You will find them men anxious to learn, even after they leave this institution. They will learn more probably after they leave the institution than while they are at it. Just let me run over a few of the prominent names of ex-students. I find that they include thirty professors of agricultural institutions in the United States.

Perhaps all of them do not rank as professors, but I call them that for the sake of convenience. You will find our ex-students on every agricultural journal in Canada. You will find that the presidents of the three Agricultural Colleges in Canada are graduates of this institution. The official heads in the Dominion Department of Agriculture are graduates of agriculture: the Minister of Agriculture now in South Africa is a graduate of this institution, and we have our own Minister of Agriculture here now, a graduate of the O.A.C. Then, I was glad to learn from Mr. Cumming that he recently sat down to dinner at the agricultural meetings at Amherst, Nova Scotia, with thirty agricultural students of this college. These people I have spoken of, do not represent two per cent. of the product of this institution. What about the balance, this large proportion of the ex-students who are working out, in practice, what they were taught here? You cannot begin to estimate what the value to this country is of these people who are scattered in different portions of the country. The newspapers are not full of their success; they are doing their work quietly, there is very little noise about them; there is a good deal of thinking, very likely. But if you will allow me to say it, these are the men who improve the cheese and butter products of this country; these are the men who, along these various avenues of life, are beginning to take the lead. Don't expect this all to be done in a day. I have heard people say, "Where are your students? I don't hear anything about them?" No; it takes a student some time after he has graduated to get a start. He is getting such an inspiration here that he will always be found working in the best interests of his country.

EX-STUDENTS' REUNION.

(Reported by the Secretary.)

The officers and students of the College extend to the visiting ex-students a very hearty welcome. We hope they may feel quite at home and have a very pleasant time.

A committee composed of Prof. R. Harcourt and Mr. H. H. LeDrew, managing editor of the *O.A.C. Review*, has been appointed to assist in looking after the interests of the ex-students when here in attendance at the Union meeting.

Arrangements have been made with the King Edward Hotel, Guelph, as headquarters for the ex-students.

As the time during the Union meeting has been very fully occupied in past years, and as there has been but little opportunity for meetings of a social character, it has been decided to have a social gathering for the ex-students at President Creelman's house and in the College reading-room this evening, from eight to eleven o'clock, instead of holding the public meeting in the gymnasium as in former years.

This is to be an informal gathering, and it is hoped there will be a large representation of the ex-student body.

Mr. J. W. Brown congratulated the committee on the arrangements made. He thought that the idea of naming a certain hotel as the headquarters of the ex-students was an excellent one. He was sure all would appreciate the hospitality of President and Mrs. Creelman, who had undertaken to hold a reception to ex-students on the first evening of the convention instead of having the usual public meeting. This arrangement would facilitate the renewing of old friendships, which was one of the important objects, he considered, of the gathering. If it were possible, he would like to see an ex-students' dinner instead of the Union dinner as held at present.

Mr. G. Fred Marsh also endorsed the report. He thought, however, that the badge proposed should bear on it the graduating year, rather than the year that the ex-students had entered the College.

On the suggestion of the Chair the following committee was appointed to take charge of the arrangements for the ensuing year: Prof. R. Harcourt, O.A.C., and Mr. H. H. LeDrew, B.S.A., managing editor of the *O.A.C. Review*.

THE *O.A.C. REVIEW* AS THE OFFICIAL ORGAN OF THE EXPERIMENTAL UNION.

By H. R. MacMillan, Editor, O.A.C. Review, Agricultural College, Guelph.

Since the *Review* became the official organ of the Union two years ago, we have published with each issue three or four good articles on leading agricultural topics. By so doing, considerable additional expense has been incurred, and we find we are not receiving the support of the ex-students to the extent we had expected, as only a quarter of the number are subscribers.

The committee desires to call the attention of the ex-students and others to the desirability of mentioning the *Review* in ordering from manufacturers who advertise in the journal. Difficulty has been experienced in securing advertisements owing to the fact that manufacturers fail, they claim, to see results. We know that our subscribers buy largely from those advertising in our pages, although we are unable to prove it to their satisfaction. It would materially assist us in this regard if subscribers in ordering or enquiring, would mention having seen the advertisement in the *Review*.

Mr. G. H. Clark suggested that the publication should be issued monthly during the entire year, and that the subscription price be raised to one dollar per year.

Mr. G. Fred Marsh considered that if the ex-student reunion idea could be further promoted, it would do much to renew interest in the journal.

The Chairman stated that he did not know of one ex-student who would not willingly subscribe, if the matter were brought to his attention in the right way and at the right time. One year a card has been sent out containing a slot in which a 50-cent piece could be inserted and remailed. If this practice were continued, it would serve as a reminder and bring, he believed, excellent results. It was not that the ex-students were unwilling to subscribe, but the matter was overlooked.

RESOLUTIONS.

Proposed Portrait of Hon. John Dryden, ex-Minister of Agriculture.

Moved by Walter James Brown, seconded by T. H. Mason, and resolved, that the members of the Ontario Agricultural and Experimental Union in convention assembled desire to express their appreciation of the splendid services to Ontario agriculture and the valuable work in behalf of the Ontario Agricultural College rendered by the Honorable John Dryden, who was Minister of Agriculture in this Province for fifteen years; and it is further resolved that the form of our expression be a portrait in oil of the Honorable Mr. Dryden for the Massey Library of the College.

Moved by Walter James Brown, and seconded by T. H. Mason, that a committee of five members of the Union be appointed to complete arrangements for the proposed portrait of Hon. Mr. Dryden, collect subscriptions, and ask the co-operation of all the associations of the Ontario Department of Agriculture, as organizations and as individual members, together with any agriculturists of this country who desire to assist, and further, that this matter be taken up at once and, if possible, the portrait be ready to unveil at the next meeting of the Union in December, 1906.

On motion, the following were appointed a committee to deal with the matter: W. J. Brown, T. H. Mason, R. F. Holtermann, G. Fred. Marsh, C. A. Zavitz.

Memorial to the Late Prof. J. Hoyes Panton.

Mr. W. J. Brown drew the attention of the meeting to the fact that a small balance remained unpaid in connection with the portrait of the late Prof. Panton, which had been presented to the College. The sum collected was about $32 short of what was required. Professors Zavitz and Hutt had assumed the obligation and the money should be refunded to them.

It was moved by Mr. W. J. Brown, seconded by Mr. Counsel, and carried, that the Union assume the obligation and refund the money advanced by Messrs. Zavitz and Hutt.

Thirty-Seventh Annual Report

OF THE

Fruit Growers' Association

OF

Ontario,

1905

(PUBLISHED BY THE ONTARIO DEPARTMENT OF AGRICULTURE, TORONTO.)

PRINTED BY ORDER OF
THE LEGISLATIVE ASSEMBLY OF ONTARIO

TORONTO:
Printed by L. K. CAMERON, Printer to the King's Most Excellent Majesty.
1906.

WARWICK BRO'S & RUTTER, Limited, Printers.
TORONTO.

To the Honourable WILLIAM MORTIMER CLARK, K.C.,
Lieutenant-Governor of the Province of Ontario.

MAY IT PLEASE YOUR HONOUR:

I have the pleasure to present herewith for the consideration of your Honour the Report of the Ontario Fruit Growers' Association, for 1905.

Respectfully submitted,

NELSON MONTEITH,
Minister of Agriculture.

TORONTO, 1906.

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Fruit Growers' Association of Ontario.

OFFICERS FOR 1906:

President	Jas. S. Scarff, Woodstock.
Vice-President	E. Morris, Fonthill.
Secretary-Treasurer	P. W. Hodgetts, Parliament Buildings, Toronto.

Directors:

Agricultural Division No. 1	A. D. Harkness, Irena.
" " " 2	R. B. Whyte, Ottawa.
" " " 3	Harold Jones, Maitland.
" " " 4	W. H. Dempsey, Trenton.
" " " 5	Wm. Rickard, Newcastle.
" " " 6	Elmer Lick, Oshawa.
" " " 7	M. Pettit, Winona
" " " 8	E. Morris, Fonthill.
" " " 9	H. H. Groff, Simcoe.
" " " 10	A. E. Sherrington, Walkerton.
" " " 11	T. H. Race, Mitchell.
" " " 12	J. L. Hilborn, Leamington.
" " " 13	G. C. Caston, Craighurst.

Ontario Agricultural College: Prof. H. L. Hutt, Guelph.

The Association at large: Jas. S. Scarff, Woodstock; W. H. Bunting, St. Catharines; Alex. McNeill, Ottawa.

Honorary Directors: Thos. Beall, Lindsay; A. M. Smith, St. Catharines; W. T. Macoun, Ottawa.

Auditor: J. M. Duff, Guelph.

Representatives to Fair Boards and Conventions.

London: T. H. Race, Mitchell; Jas. S. Scarff, Woodstock.

Ottawa: R. B. Whyte, Ottawa.

Toronto: W. H. Bunting, St. Catharines; P. W. Hodgetts, Toronto.

Michigan Horticultural Society: T. H. Race, Mitchell.

Quebec Pomological Society: A. D. Harkness, Irena.

Dominion Conference of Fruit Growers: M. Pettit, W. H. Bunting, A. W. Peart, Robt. Thompson, Elmer Lick, Harold Jones, J. L. Hilborn, D. Johnson, A. E. Sherrington.

Committees:

Executive: President, Vice-President, Secretary, with W. H. Bunting and Harold Jones.

Board of Control, Fruit Experiment Stations: G. C. Creelman, Chairman; Prof. H. L. Hutt, P. W. Hodgetts. Elected by the Association: A. M. Smith, Elmer Lick, W. T. Macoun.

Transportation: W. H. Bunting, R. J. Graham, E. D. Smith, W. L. Smith, Robt. Thompson, H. W. Dawson.

Co-operation: A. E. Sherrington, D. Johnson, W. D. A. Ross, Robt. Thompson, Elmer Lick, A. W. Peart.

New Fruits: Prof. H. L. Hutt, W. T. Macoun and E. Morris.

Historical: Alex. McNeill, T. H. Race, L. Woolverton, H. H. Groff, W. H. Dempsey.

Fruit Show: W. H. Bunting, T. H. Race, Elmer Lick, P. W. Hodgetts.

PRESIDENTS OF THE FRUIT GROWERS' ASSOCIATION OF ONTARIO, 1859-1906.

1859-60—Judge Campbell, Niagara.
1861-66—Judge Logie, Hamilton.
1867-69—Wm. H. Mills, Hamilton.
1870-79—Rev. R. Burnett, Hamilton.
1880-82—P. C. Dempsey, Albury.
1883-86—Wm. Saunders, London.
1887-89—A. McD, Allan, Goderich.
1890 —A. M. Smith, St. Catharines.
1891 —J. A. Morton, Wingham.
1892-93—A. H. Pettit, Grimsby.
1894 —T. H. Race, Mitchell.
1895-96—M. Pettit, Winona.
1897-99—W. E. Wellington, Toronto.
1900-01—W. M. Orr, Fruitland.
1902 —G. C. Caston, Craighurst.
1903-04—W. H. Bunting, St. Catharines.
1905 —Alex. McNeill, Ottawa.
1906 —Jas. Scarff, Woodstock.

Fruit Growers' Association of Ontario.

DIRECTORS' MEETING.

The Annual Meeting of the Board of Directors of the Ontario Fruit Growers' Association was held at Albert Hall, Victoria Street, in the City of Toronto, on Tuesday, November 14th at 4 p.m. o'clock.

The following Directors were present: W. H. Bunting, Alex. McNeill, Thos. Beall, J. S. Scarff, A. D. Harkness, Harold Jones, T. H. Race, A. E. Sherrington, J. L. Hilborn, Wm. Rickard, W. H. Dempsey, Elmer Lick, C. W. Vanduzer, H. H. Groff, A. M. Smith, G. C. Caston, W. T. Macoun.

The President, Mr. A. McNeill, occupied the chair.

The minutes of the previous meeting were read and confirmed.

The Secretary presented the following Report from the Executive:—

REPORT OF THE EXECUTIVE, 1904-5.

The year 1905 will be recorded by the fruit growers generally throughout Ontario as one of fair crops and good prices. While some sections have been short in the apple crop, the other fruits, particularly the small fruits, have borne well and brought good returns. The reports of the Directors on the questions sent out by the Executive, would indicate that in the northern and western parts of the Province, the apple crop was poor both in quantity and quality, the scab being very bad especially in unsprayed orchards. In the east, little scab was present, except along the St. Lawrence, where it developed late on such varieties as Fameuse and McIntosh. The codling moth, owing to the short crop, made its presence felt, perhaps more than usual. The labor question still seems a serious one with the fruit grower, and reports from all sections would indicate that the exodus of men to the west and towards the towns and cities has left the farmers more dependent than ever on the inexperienced immigrant and female labor.

Your Executive have endeavored, this past Association year, to put more of the work on the Standing Committees. Owing to lack of funds in previous years, these committees have been unable to get together again after the annual convention, and were so prevented from doing the effective work that might otherwise be accomplished. While a beginning was affected this year, we hope to do even better in the future.

The committee appointed to consider the revision of the constitution, organized at the annual convention in November last, and met at the call of the executive on January 14. A whole day was spent discussing the matter. Owing to the uncertainty relating to the Horticulturist, and also to the Horticultural Societies, nothing definite was settled upon at that time. On October 25th, a portion of the committee met in St. Catharines and outlined the revision which is to be presented to the Association on Wednesday morning. Copies of the proposed constitution have been distributed to all the members, with the request that the same be carefully looked over previous to the meeting.

The Committee on Co-operation talked over matters after the last days' meeting, and decided upon their line of work for the year. A second meeting of this committee was called in April. A number of points were settled upon, and the committee waited upon the Hon. Mr. Monteith to present to him the claims of the fruit growers. A set of rules and regulations governing local co-operative shipping associations was drawn up by the secretary, and after some changes, approved by the committee. (See Appendix A.) Mr. Putnam, the Superintendent of Institutes, looked after the meetings suggested in the interests of fruit growers, and with the assistance of your secretary, a list of meetings was drawn up, and successfully carried out. Mr. Sherrington also visited a number of scattered places, and did good work in organizing and enthusing the growers. Among the places visited were:

Delegates: A. E. Sherrington, Walkerton; P. J. Carey, Dominion Fruit Inspector, Toronto.

Forest	Jan.	27
Thedford	"	28
Oshawa	March	6
Pickering	"	7
Claremont (aft)	"	8
Myrtle (eve)	"	8
Whitby (aft)	"	9
Grange Hill (eve)	"	9
Ingersoll	"	22
Norwich	"	23
Cainsville	"	24
Oakville	March	25
Clarkson	"	27
Islington	"	28
Churchill	"	29
Collingwood	"	30
Thornbury	"	31
Meaford	April	1
Owen Sound	"	3
Allanford	"	4
Simcoe	May	11
Burford	"	12

Delegates: D. Johnson, Forest; A. Gifford, Meaford.

Tupperville	March	20
Thamesville	"	21
Dutton	"	22
Sparta	"	23
Appin	"	24
Ilderton	"	25
Parkhill	"	27
Goderich	"	28
Blyth	March	29
Brussels	"	30
Lucknow	"	31
Walkerton	April	1
Paisley	"	3
Port Elgin	"	4
St. Mary's	"	5
Simcoe	May	10

Owing to the representations of the Co-operative Committee, two changes were made in the Act relating to Cold Storage Companies, and power sprayers were placed in operation at Meaford and Trenton under the charge of your secretary. Fuller reports of what has been accomplished will be submitted by this Committee in their report to the Association.

The Transportation Committee have also been active during the year. While nothing definite in the way of concessions from the railways have been granted, a much better feeling has arisen between the grower and the carrier. The committee met once in the early spring at the call of Mr. Bunting, and talked over the matter of cars with Mr. Hardwell, the chief traffic officer of the Railway Commission. A second call was issued on October 15th to consider the serious shortage of cars for apple shipments. A strongly worded protest was sent to the Railway Commission at this time. A full report from this committee will be submitted later in our sessions.

It might be well to refer here to the good work accomplished by a number of the members of the St. Catharines Cold Storage Co., who entirely at their own expense undertook this season to forward cars of fruit regularly to the western markets, with the idea of opening up a profitable outlet for their surplus fruit, and who incidentally have assisted the Transportation Committee in working out some of the problems relating to ventilated and refrigerator cars. A very interesting report on the work will be submitted on Thursday afternoon. Your Executive Committee have met as a body several times during the year, outside of the meetings at the time of our Annual Convention. The Executive met in January to discuss the general plan of work for the year, and to settle, if possible, some of the details in connection with the transfer of *The Canadian Horticulturist*, to the new Company. Two other meetings were necessary before these details were finally settled. Copies of the transfer were drawn up with legal advice, and signed on behalf of both associations. This document in detail will be submitted by the committee to-morrow. A settlement of all outstanding accounts has been made by the payment of a sum of $200 to the Association by the company. A number of other small payments were made in connection with the transfer. Your Association has received $1,000 worth of fully paid up stock in lieu of their good will in the paper, and has further paid $300 as 1st, 2nd and 3rd calls on a second $1,000 of stock as authorized by the Association last November.

The officers of the Hamilton Horticultural Exhibition wrote early in September asking for a grant toward their first district show this year. They were offering quite a large sum in prizes for fruit, and had appointed two representatives of our Association on their Board. Their entries in the fruit section were quite large and distributed well over the surrounding country. After some consideration, a grant of $50 was made on the understanding that hereafter no further financial assistance would be given to such exhibitions.

In connection with the Toronto Exhibition, further changes were made in the prize lists on the suggestion of your committee, largely in the rearrangement of the classes. Collections were grouped together, a list of best varieties of apples placed in a commercial class by itself and cash prizes substituted for medals in the box and barrel sections. In these commercial classes, the results were very gratifying, as shown by the entries. The competition among the growers was keen, and the explanations of its judges and Mr. Boies of British Columbia, who was present, were very instructive.

In connection with the old trouble in regard to the unsuitability of the present building, there seems little hope of improvement for two years at least. The announcement was made after this year's exhibition closed, that the new buildings to be erected for the live stock and other agricultural interests would not be ready till 1907.

MEMBERSHIP.

No question has given the officers of the Association more trouble during the year than that of membership. Up till last November, largely through the *Horticulturist*, the nominal membership in the Association had risen to over 4,000. Of this number, fully 90 per cent. were merely subscribers to the magazine through the Horticultural Societies, or directly through the payment of the price of subscription. They took no apparent interest in the Association itself and were only a source of expense. With the transfer of the magazine to an independent company, and in the reduction in the subscription rates to societies, this inflated membership disappeared, as the societies sent their lists in almost all cases, directly to the business manager of the *Horticulturist*. In response to an appeal from the secretary through the columns of the magazine, not more than a dozen individual subscribers sent in their names. It is apparent that our future membership must come from among the fruit growers, either amateur or professional, and less from the societies, unless some radical change is to be made in our work. It is undoubtedly true, however, that a few of our Horticultural Societies are composed quite largely of fruit growers, and some effort should be made to look after their interests. We should certainly aim to gather into our Association the members of all co-operative associations, and local or district fruit growers' associations. These should form the backbone of the Association. The question is one for earnest consideration at this annual meeting. Our membership is this year apparently only 359.

Co-operative associations, and local and district fruit growers' associations are now scattered well over the southern, western and northern parts of Ontario and include among others the following active associations:

The Niagara District United Fruit Growers' Association.
The St. Catharines Cold Storage & Forwarding Co.
The Chatham Fruit Growers' Association.
The Forest Fruit Growers & Forwarding Co.
The Fruit Growers' Co., of Oakville.
The Burlington Horticultural Society.
The Bruce Fruit Growers' Association.
The Clarksburg Association.
The Meaford Fruit Growers' Association.
The Port Elgin Fruit Growers' Association.
The Parkhill Shipping Association.
The Thedford Shipping Association.
The East Lambton Fruit Growers' Association of Arkona.

It should be our aim at this convention to so arrange our constitution as to admit of receiving all of these and kindred associations into our membership. They are the men whom we are working for, and we wish for their support.

The programme for this year's convention is largely a business one. Owing to the importance of the work of the special committees, it was felt necessary to give them the opportunity to report in full. Several important matters in connection with the Association are to be brought up for discussion, including the transfer of the *Horticulturist*, the Revision of the Constitution, and the Dominion Conference of Fruit Growers, which is expected to meet in February, 1906. However, in addition to the purely business sessions, your Executive have succeeded in getting Mr. A. N. Brown, of Wyoming, Delaware, to deliver a couple of addresses on topics of live interest to fruit growers. Mr. Brown has wide experience in fruit growing and has already made a name for himself in Ontario through his series of addresses in the Niagara District last spring. Beside Mr. Brown, we expect interesting addresses from Mr. Shutt of the Central Experimental Farm, Ottawa, Mr. Ruddick of the Agricultural Department at Ottawa, Prof. Harcourt, of Guelph, and others. Mr. Thompson, of St. Catharines, has a very important report to bring in on the results of their attempt to open up the Winnipeg market for Ontario fruit.

The Fruit Exhibition.

In the financial statement for the past year, you will find a statement of the show of last November. The show itself, as an exhibition of fruit, was undoubtedly a success, and was a revelation to the people of Toronto in regard to the quality of apples put up in cases and barrels. The sale of fruit at the close of the show brought fair returns, and about balanced the expenses incurred by the Association for express, freight and cartage. Some opposition was offered this year to the clause referring to prize fruit becoming the property of the Association, and in regard to the Association Exhibits, it was decided to forgo this privilege on the understanding that the exhibitor pay transportation charges and storage.

The buildings used last year were very inconvenient in regard to location, and undoubtedly affected the attendance. The absence of proper heating facilities also was a source of annoyance and heavy loss, especially to the florists. The lighting was better than we are likely to have in Massey Hall. In every other way, the present hall is much better than the Granite Rinks, and the gate receipts should be proportionately greater. Last year, as seen by the financial statement, the running expenses were just about covered by the gate receipts. This year's exhibition, judging by the entries, should make the best show of fruit ever gathered together in Canada. The total entries are about 600, including county exhibits, with 41 barrels, 92 cases, and plates of apples; 29 half cases, 27 plates, and 9 baskets of pears; 66 plates of grapes, 12 cases of grapes, and 123 jars of canned fruit, jam and jelly.

The county exhibits, a new feature worked out entirely by the President, Mr. McNeill, will make quite an addition to an already attractive prize list. While only about half of the counties offering the prizes will be represented, owing partly to the late issue of the lists, and partly to the difficulty of advertising the scheme properly, it is to be hoped that it will lead the way to its repetition on a larger scale another year, should the exhibition be continued. A better selection of varieties for most of the counties could also be made.

The general list differs from last year chiefly in the following classes:—

6. Pyramids of fruit, an entirely new class.
13. Canned fruit, 10 sections added.
14. Jam, a new class.
15. Jelly, a new class.
16. Wine, a new class.

The list itself was later in coming out than in 1904, due entirely to the action of the advertising committee of the Show. The copy for the fruit lists was sent down in time for the issuing of the prize lists at the Toronto Industrial. Delay in securing the advertising was given as the excuse for not getting these lists printed sooner. Your executive will ask for the permission of the Directors to print an entirely separate list next year, should it appear that the general list will not be issued by the 1st of September.

The first meeting of the Show Board was called in April, when the general committee was re-organized, and officers elected. Mr. Score, of Toronto, was re-elected President; Mr. Bunting, Vice-President; Mr. Chambers, of Toronto, 2nd Vice-President; Mr. Dunlop, of Toronto, Treasurer; and Mr. Cowan, General Secretary. A grant of $1,200 from the Department was made for this year, and Mr. Cowan stated that the sum would have to be divided: $600 for Fruit, $200 for Vegetables, $200 for Honey, and $200 for Secretary's expenses. Last year your Association received $600 from this grant, and $50 extra. After some discussion this year it was decided by the Associations represented to pool all grants, donations from private parties, etc., into one fund, to go toward the general expenses of the Show. The question of a suitable building was thoroughly discussed, and Massey Hall was chosen as the best possible place in every way of those available. The cost, $650 for the week, was very little higher than that incurred last year at the Granite rink, owing to the expense in heating and lighting the latter place.

In arranging the dates of the Show considerable trouble arose owing to the uncertainty of the date to be fixed for Thanksgiving Day. This holiday made a great difference in our receipts last year. As far as the Committee could find out, the holiday was proposed for the same week as last year, but, to our surprise, the 26th of October was finally chosen by the authorities at Ottawa. As this date was too early for the Show, it was decided to choose the week of the 13th of November. It will not be known till the close of this week what effect this will have on the gate receipts as compared to last year.

Since the re-organization, in April, a number of meetings have been held from time to time as matters of importance arose. Each Association, through its representatives, was given four votes on all questions. Mr. Bunting and Mr. McNeill generally arranged to attend these meetings, while your Secretary was present on each occasion. It would seem advisable that a Standing Committee of four members should be appointed, either by the directors or by the Association at large, to look after the interests of the fruit growers in connection with the Show.

The whole matter seems one of considerable interest to our Association. Up till 1904 the annual meeting was the great event in the year, with its programme of interesting addresses, the election of officers, and other matters of importance. A fruit exhibit generally formed part of the programme, but it was of subsidiary interest. No prizes were offered in money, nor were premiums of any kind awarded. Last year the conditions were somewhat reversed, and this year matters seem even worse. The annual meeting, with its programme as an educational feature, would appear to be losing its individuality, and becoming a matter of secondary consideration. The question of the moment is whether such should be permitted. The choice of a meeting-place for the conventions has much to do with the relations between the Show and the programme. For instance, in connection with the Fat Stock Show at Guelph, the hall is within the main exhibition building, the programme is going on all the time, and every stock man present makes an effort to hear some of the addresses that are delivered during the days of the Show. The hall is always crowded, even more so than the aisles between the stock, and great interest is always taken in this, the main feature of the Show.

Here, in Toronto, the professional florists are not interested in the programmes. They at present contribute largely to the exhibition, and have a controlling vote in all questions relating thereto. At the board meetings all matters in regard to programmes are accordingly shelved, and the show of flowers, fruit, vegetables and honey is alone discussed. How this trouble may be avoided, and our programmes brought more to the front, is a question which should be settled at the meeting this year.

Discussion.

The President: The question of the relative importance of the convention meetings and of the exhibition is one that might very well be discussed in connection with this report. The question is whether the Association is losing its old-time importance as an educative factor in connection with fruit-growing.

Mr. Harold Jones: The late Secretary maintained that the educative work which was formerly done by this Association was now being performed by the Farmers' Institute, and the local horticultural societies. I think it is a question whether this is really a fact, and whether these bodies can perform the work as effectively as this Association. It is a question whether the Association will not lose its influence by making the Show the leading feature instead of the convention meetings.

Mr. **Sherrington**: This is a subject which has already been fully discussed. The conclusion was reached that we should have to drop the purely educational features of our annual meeting, as there was too much other business to do. We decided that the work of education could be carried on better outside, through the local horticultural and fruit growers' associations. These associations should be affiliated with the Provincial Association, and this will add to our membership and influence. Since this policy was outlined, my experience leads me to believe that we are progressing in the right direction. At the same time it should not be forgotten that the exhibition is itself of great importance from an educational point of view.

Mr. **Harold Jones**: I think it would be unwise to allow the value of our annual report to run down. The reading public is increasing, and if topics of interest to them are not discussed there, it will be necessary for the executive to secure material from these outside meetings and embody it with the report.

Mr. G. C. **Caston** took the view that the discussion of matters relating to practical fruit growing should be continued at the convention.

Mr. W. H. **Bunting**: I do not think there is any difference of opinion between the directors as to the value of the Association's exhibition work; but we have come to a critical stage in the history of the Association. Our coming to Toronto, with the possibility of making this a permanent location for our annual meeting was, of course, tentative. We ought now to be able to judge whether that course is likely to prove of greater value than the one formerly pursued. In coming here we have encountered the difficulty that we have not been able to find a location where the Exhibition and the Association meetings could be satisfactorily combined. I fully agree with Mr. Sherrington as to the importance of carrying to the people in the different sections of the Province the information which an Association like this should supply. In accordance with that idea we held last year, in the Niagara district, a series of meetings which lasted for about a week. They were spread over the entire district, and were, perhaps, the most successful series of fruit meetings ever held in this Province. If this plan could be more widely adopted it would do away with the necessity of making this educational work a feature of our Convention. At the same time, I think that some of our meetings ought to be devoted to bringing the masses of our fruit growers together, and placing before them matters of national and provincial importance.

The **President**: There is no doubt the time has come when this Association should give more attention to the business side of fruit growing than to the educative side, and that we should relegate the elementary work to the local societies; but, at the same time, we must see to it that the educative work is carried on in an effective manner through the local societies, or else we shall be neglecting our duty to the public.

Mr. **Sherrington** enquired whether subscribers to "The Horticulturist" were members of the Association.

Mr. **Bunting**: When *The Horticulturist* was transferred to the company that has taken it over, a little embarrassment arose as to what constituted a member of the Association, and what a subscriber to *The Horticulturist*. In the past it was a case of subscribing to the journal, and becoming a member of the Association by so doing. The consequence was that we had a very extended list of members, many of whom took no interest in the Association's work. What we want is men who become members for the sake of the Association, and not to make membership one of the advantages incidental to subscribing to the magazine. Our new constitution will, however, solve some of these difficulties.

Mr. Macoun: I think it would be well if something could be done to bring the local directors into closer touch with the fruit growers and flower growers of their respective districts. My view is that all societies receiving Government aid should be required to notify the local directors when they intend to hold meetings, so as to give them an opportunity of being present. This would enable them to keep in touch with their work, and, incidentally, it would give them a better opportunity of ascertaining the facts regarding the local fruit crop on which they are required to report.

Mr. Sherrington: He could not gain this information from the horticultural societies, as they are interested in floriculture almost exclusively. As far as increasing our membership is concerned, I think we must look for it to the local Fruit Growers' Associations, and to them we must look for our information regarding the crop.

Mr. Bunting: I do not think we should deprecate the value of the horticultural societies and their affiliation with this organization. In our town we have a live horticultural society, and our fruit growers take a deep interest in it, although we have several local fruit growers' associations. Harmony and good feeling between the various societies should be maintained by every possible means, as all tend to the advancement of general horticulture.

Mr. Rickard: We formed local fruit growers' associations a few years ago at Orono, Newcastle, and Bowmanville. They made a good start, but, as far as I am aware, they are now defunct. I think it would be desirable for this Association to do something to maintain the interest in these local associations. I agree with Mr. Jones that the educative work of the Association is first in importance. We should aim at educating our fruit growers to produce first-class fruit.

Mr. H. H. Groff: The difficulty seems to be that the men who make a business of fruit growing are numerous only in certain limited portions of the country. If that is admitted, then it is obvious that you must unite with other kindred interests, and form societies more or less sympathetic with all lines of progressive horticulture. The horticultural society of our town, of which I am President, is engaged in all kinds of educational work, but, primarily, in work among the school children. In this we have been most successful, and our exhibition, in which the children receive awards, is the most encouraging side-line of our horticultural work. Our meetings are well attended, and these societies are still in full force in our county.

The President: The remarks that have been made as to the necessity of further educational work are extremely pertinent, and I do not think that, as an Association, we should relegate this entire work to the Farmers' Institutes or the local societies. It might be a good thing if this Association would appoint a committee to co-operate with the Superintendent of Institutes in arranging orchard meetings and fruit meetings generally. I have always found Mr. Putnam exceedingly ready to accept any suggestions that were made.

Mr. Sherrington: I do not think there is any better means of reaching farmers interested in fruit growing than through the Institutes. The Superintendent has been most energetic in advertising these local Fruit Institute meetings. Not only does he give notice through the press, but he sends a circular letter to every Institute member in the district, inviting him to attend. Where no such organization exists, the Department has paid for the advertising.

The President: I entirely agree with what Mr. Sherrington says. My suggestion was merely by way of offering him some assistance from the Association.

Mr. Bunting: As to local associations not being very long lived, I think this may sometimes be attributed to the fact that in the past they do not appear to have had any definite work to perform. In our own section these societies are developing into co-operative associations with definite objects in view. As soon as they take up definite work you will find that there will be no difficulty in this respect. So far as the educational work is concerned, I would again refer to the series of meetings we held last spring. There is no reason why a similar series should not be conducted every year in each of the thirteen districts.

Mr. G. C. Caston: In regard to county prizes, I think that this idea is a good one, and should be written up by the local press, and interest developed in that way. Then some plan should be formulated as to how the prizes are to be awarded.

Mr. Harold Jones: I met with some difficulty at first in interesting our council in the matter, as none of them were fruit growers. I had to make my representations somewhat forcibly, and I think what took their fancy was that Leeds and Grenville would be represented here in Toronto. As soon as I succeeded in securing a grant, I called for the assistance of a committee from the council, and we wrote up a prize list to suit the conditions of the county in which the fruit is grown. I promised the council that if the prize money granted was not awarded, they would get it back. I took that responsibility upon myself, and, if this Association does not support me, I will pay it out of my own pocket. I wanted them to understand that it was purely an educational feature, and an attempt to create a greater interest in fruit growing in the locality. If I am able to go back and report that the prizes have been widely distributed over the country, as I have every reason to believe will be the case, I have no doubt that next year they will be willing to give a still larger grant. Next year I propose to have the prize list ready about the first of September, and to give each member of the council half a dozen copies to distribute to the men who grow fruit in their neighborhoods. The responsibility for securing the grant rests mainly with the local director. He should gather together as many members of the council as possible and clearly explain the intention of the grant to them. We have to formulate the plans, and, if they are presented properly, the councils will, in the majority of cases, fall in with them.

The President: The idea of county prizes is, to my mind, a good one, but, in working out the plan, we fell somewhat short of what might have been done. The fact is it had to be attended to at a time when business was very pressing, so that it was impossible to give as much attention to outside work of this kind as was desired. I am rather surprised to find that it turned out as well as it did. I think next year will show an improvement, and that it will be worked out to much better advantage.

It was then moved by Mr. T. H. Race, seconded by Mr. Beall, and carried, that the report be received and laid upon the table for further consideration.

TREASURER'S REPORT, 1904-5.

Receipts.

Balance on hand, Nov. 12, 1904	$853 59
Fees	174 55
Horticulturist	204 00
Binding	40
Annual Meeting	2 00
Government Grant	1,800 00
Show	1,051 05
Sundries	50 08
	$4,135 67

Expenditure.

Horticulturist	$1,208 19
Annual Meeting	313 87
Committees	54 00
Salaries	533 32
Show	916 70
Audit	9 50
Exchange	30
Incidentals	63 03
Binding	57 69
Stationery	29 75
Postage	25 00
Balance on hand, Oct. 31, 1905	924 32
	$4,135 67

Details of Expenditure.

Canadian Horticulturist:
Balance in hand of Business Manager, $165.99; Subscriptions for members of Association, $145.20; Spectator Co., $697.00; Horticulturist Pub. Co. (payment on stock), $200.00 .... $1,208 19

Salaries:
H. B. Cowan, $83.32; C. B. Morse, $250.00; P. W. Hodgetts, $200.00... 533 32

Committees:
Transportation (services of lawyer before Railway Commission), $20.00; W. L. Smith, $4.00; J. L. Hilborn (attending Michigan Society meeting), $14.65; Jas. Scarff, $7.85; R. J. Graham, $7.50 .... 54 00

Annual Meeting:
G. H. Powell, $43.25; J. W. Nimmo (reporting), $5.00; R. B. Whyte, $21.95; G. C. Caston, $7.40; A. M. Smith, $6.00; E. Lick, $4.75; A. D. Harkness, $22.40; J. L. Hilborn, $18.05; Harold Jones, $8.20; Thos. Beall, $11.75; A. K. Goodman, $9.10; Murray Pettit, $6.00; W. H. Dempsey, $7.15; A. E. Sherrington, $15.62; W. H. Bunting, $18.15; Jas. Scarff, $14.10; W. B. Varley (reporting), $95.00 .... $313 87

Show:
P. W. Hodgetts: (Cartage, $6.00; express, $9.19; tools, $1.35; car fare, $2.50; pins, 90c.; freight, $16.04; express, $58.86; sundries, $5.16; total, $100.00; T. Eaton Co., decoration, $25.00; Model Cartage Co., $1.90; Treasurer, Fruit, Flower and Honey Show, $100.00; R. W. Starr (Judge's expenses), $92.70; Miss A. M. Fox (office expenses), $10.00; Dennison & Co., pins, $1.49; Ray & Hatfield, fruit, $3.50; Bryant Press, $17.00; Douglas & Ratcliffe, paper, $6.00; Toronto Cold Storage, $51.31; W. H. Bunting, travelling expenses, $24.45; W. H. Bunting, fruit, $21.75; prize money, $461.60 .... $916 70

Audit:
J. M. Duff 9 50

Exchange:
Canadian Bank of Commerce 30

Incidentals:
Hamilton Horticultural Society Exhibition, $50.00; Telegrams, 88c.; Jas. Dorman (office work), $5.00; S. P. Morse (back numbers of Horticulturist), $7.15 .... 63 03

Binding:
Brown Bros. 57 69

Stationery:
Bryant Press (letter heads and envelopes) 29 75

Postage:
Mrs. Hubertus 25 00

FINANCIAL STATEMENT OF THE FRUIT, FLOWER AND HONEY SHOW, 1904.

Receipts.		*Expenditure.*	
Coupon tickets	$261 90	Commission on tickets	$13 20
Members' tickets	59 00	" " ads	30 50
Gate receipts	871 45	Heating and lighting	188 80
Ads. in prize list	171 00	Labor	271 62
Sale of lumber	19 75	Music	188 00
Grants from associations	200 00	Printing and advertising	542 60
		Lumber	49 24
		Rent of rinks	100 00
		Incidentals	112 70
		Balance	86 44
	$1,583 10		$1,583 10

Balance of $86.44 was handed to Treasurer of the Floral Section to go toward payment of their prize list.

P. W. Hodgetts,
General Treasurer.

On the motion of Mr. Caston, seconded by Mr. Dempsey, the Report was adopted.

PURCHASE AGREEMENT.

The Secretary read the agreement regarding the purchase of *The Canadian Horticulturist*, as follows:

Memorandum of agreement made this first day of April, A.D. 1905. Between Ontario Fruit Growers' Association, hereinafter called "The Association," of the first part, and *The Horticultural Publishing Company, (Limited)*, hereinafter called "The Company," of the second part.

Whereas the Association are the publishers and proprietors of the publication known as *The Canadian Horticulturist*.

And whereas the company are a corporation incorporated by Letters Patent under the Ontario Companies Act, and one of the objects which the incorporators had in view at the time of the incorporation of the said company, was the acquiring of the said Canadian Horticulturist.

And whereas the Association agreed to sell and transfer the said publication to the said company, but the said agreement had not been reduced in writing.

Now therefore this memorandum of agreement witnesseth that the Association agrees to sell and the company agrees to buy the said publication known as *The Canadian Horticulturist'* together with all rights incident thereto and to the publication thereof, and all copyrights used or enjoyed in connection therewith or with the publication thereof, and all the good-will attaching to the said publication, all subscriptions therewith, and all other appurtenances thereof, including one complete file of the magazine since the first date of publication, but not including all extra numbers of *The Canadian Horticulturist* issued previous to December, 1904; and all other documents not herein mentioned at and for the price or sum of one thousand dollars; and the said Association agrees to accept in full payment of the said sum twenty shares of the capital stock of the said company, of the par value of one thousand dollars.

The said Company agrees to allot to the said Association, the said twenty shares of its capital stock of the par value of one thousand dollars.

The said Company further agrees with said Association that the said stock so to be allotted to the said Association while it remains the ownership of the said stock to be represented on the Board of Directors of the said Company by one Director.

The said Association in consideration of the premises and of the said stock hereby covenants and agrees with the said Company that it will not directly or indirectly engage in the publication or distribution within Ontario, of any newspaper, magazine, or periodical or any paper or publication of a like nature, with *The Canadian Horticulturist*, or one likely to compete with the said *The Canadian Horticulturist*, for a period of twenty years.

The said Association retains the right to issue to its members, fruit crop reports, statistics, price lists, and market reports.

The said Association also agrees, for the consideration aforesaid, to assign and transfer to the said Company, any and all the copyrights and other rights and appurtenances belonging to or used or enjoyed in connection with the publication of the said *The Canadian Horticulturist*, and that it will hand over to the said Company, a full list of all subscribers to the said *The Canadian Horticulturist*, and that it will sign, execute, and deliver to the said Company, such further assignments, documents, and assurances as may be necessary to transfer to the said Company, the before mentioned property and rights and subscription lists, advertising, and other contracts.

It is understood and agreed by and between the said Association and the said Company, that the transfer of the said publication shall take place as of the first day of December, 1904, and the expenses and receipts shall be adjusted between the parties as of that date.

Signed,
A. McNeill,
President, Fruit Growers' Association.
P. W. Hodgetts,
Sec.-Treas., Fruit Growers' Association.
Wm. H. Bunting, President,
The Horticultural Publishing Co., Limited.
H. B. Cowan, Sec.-Treas.,
The Horticultural Publishing Co., Limited.

Mr. Race enquired as to what relationship now existed between the Association and *The Horticulturist?*

The President explained that the Association held shares in the Company controlling *The Horticulturist*, to the amount of $2,000, and that it nominates one director to the Board, in which capacity he had been acting until some one could be appointed by the Association.

In reply to an enquiry from Mr. Bunting as to the opinion of the members regarding the present standing of the magazine, Mr. Caston said that it had improved very much. In this view Mr. Groff concurred, and stated that Canadians interested in horticulture could now be reached through its columns, whereas formerly it was necessary to use journals published in the United States for this purpose.

Mr. Race said that he had spent a great deal of his time among the Americans, during the last two years, and had acquainted himself with nearly all similar publications on that side, and he admitted that it was now pretty nearly equal to the best of them.

The meeting of the old Board then adjourned.

OPEN MEETING.

An open meeting of the Association was held in Albert Hall, Toronto, on Tuesday evening, November 14, at 8 p. m. o'clock. The Honorable Nelson Monteith, Minister of Agriculture for Ontario, occupied the chair.

ADDRESS.

By Hon. Nelson Monteith, Toronto.

It was only on the understanding that the chairman is free from the obligation of making an extended address that I consented to preside at this meeting. Nevertheless, there are a few remarks that I should like to make to those gathered here who are interested, I take it, in the production of fruit, flowers, honey and vegetables, four of the leading products of this Province, which are displayed to such good advantage in Massey Hall. From an economic point of view they are products of the greatest possible value and importance to the community, and the growers are to be heartily congratulated on the notable collection they are able to present to the public. The specimens displayed a very high tribute to the skill of the producer.

In the pioneer days of this Province the simplicity of the life which was led by our people did not call for many products that are to-day looked upon as necessities. Conditions have changed until to-day we find that these products have an important place in every household, and the comfort and welfare of the community is largely increased thereby.

There is a feeling abroad in some quarters to-day that agriculture is second in importance to manufacturing, but agriculture is and will continue to be the primary basis of wealth in the community. The tendency of agriculture to-day is to become more and more a manufacturing industry, and in that sense it is allied to some extent to manufacturing. A study of the business methods adopted by the manufacturer might profitably be undertaken by the farmer. At this period in the history of the country more intensive farming is called for. With the opening up of Manitoba and the Northwest, the conditions surrounding the calling in this Province have greatly changed, and the methods adopted must necessarily change in accordance therewith. The conditions which surround society in the rural districts to-day are such as were never thought of several decades ago. Railroads, telephones, and trolley-lines are spreading through the country and bringing different classes in the community into closer touch with one and another. Land valuations are bound to increase where these conditions obtain, all calling for more intensive methods. You who are interested in the growing of perishable products realize how important it is that they should be placed in the hands of the consumer as speedily as possible, and in this connection the developments I have mentioned are bound to be of the greatest value to the producer.

The vegetable growers are becoming thoroughly alive to the fact that they require to be reasonably close to the point of consumption. In order that consumption may be increased, it is necessary that their product should be of a high standard of excellence, and that it should be placed before the consumer in the best possible condition and at a price that brings it within reach, so that the masses of the people may take advantage of it. The same is true in other lines of horticulture. With these conditions and problems confronting the industry, it will be admitted that there is still room for the closest study and investigation. In the production of varieties better suited to conditions, there is ample opportunity for the best efforts of the scientist and for the best thought and intelligence that can be brought to bear. At this period in the development of the country, this work is very essential. Wealth and population are centralizing to a great extent, and products having special excellence are in increasing demand. This is a happy state of affairs for the producer who is willing and able to produce the best and put it up in the best form for the market.

I have found since it has been my privilege to move around in agricultural circles that what we need in this Province is not so much extensive farming as intensive farming. The smallness of the profit obtained is driving many men from the farm to other callings. This is a trend of affairs that is very much to be deplored. How may this be remedied? It seems to me that it is the duty of those who are better equipped for the battle of life to direct those men who are working at a loss to more intelligent effort—to teach them what things can be done profitably and how to do them in a profitable way. Then the question arises, how are we to get hold of those men who are misdirecting their efforts and securing inadequate returns? How can they be put in touch with those who can aid them to secure a fair return for their labor and thus add to their own prosperity and aid in the upbuilding of the Province. How are we to increase our rural population, and teach those who engage in agriculture to secure a maximum return from the soil? These are among the most important problems that confront us at the present time. While I am prepared to admit that there are great opportunities for the men who settle in the northern portions of this Province and in the Northwest to secure homes of their own at a small outlay, I believe that even greater opportunities exist in some of the older portions of the Province where the capabilities of the country have been definitely ascertained. What we particularly require in the development of this country is men who will add something to the actual wealth of the community, as many of those before me have done in connection with fruit, flowers, and vegetables. Our young men should be taught to realize how many avenues of usefulness are open to them if they will avail themselves of the opportunities that exist in this direction. I feel that it will not be out of place for me to express at the present time on behalf of the agriculturists of this country our appreciation of the fact that our sovereign has seen fit to recognize the labors of one of our leaders of thought in connection with agriculture, namely, Sir William Saunders. It is a recognition of the importance of our calling. It should prove an inspiration to our young men and lead them to recognize that this is a calling in which the best intelligence and effort may be profitably employed.

PRESIDENT'S ADDRESS.

BY ALEX. McNEILL, OTTAWA.

I would direct your attention to the report of the executive for particulars of the work done by the Association during the year. It may not be out of place, however, for me to commend particularly the enthusiasm and industry of the Transportation and Co-operative Committees. These have met several times during the year and in their different capacities have done most effective work. Reductions have been made in the freight rates on fruits; attention has been drawn to defects in the transportation system, and the Co-operative Committee can point with pride to a large number of Associations working successfully by co-operative methods. The spraying experiments in charge of our secretary, Mr. P. W. Hodgetts, will be separately and specially reported. The fruit shipments from St. Catharines have been a most important undertaking, and the more so from the fact that there was no guarantee of prices nor any promise of indemnity for losses. In a public-spirited way the St. Catharines Cold Storage Compay arranged and carried through these experiments, a full report of which will be given by the President of the Company.

I need scarcely draw attention to the magnificent proportions to which the Horticultural Exhibition has grown this year. This remarkable interest in the exhibition of fruit, flowers, honey and vegetables has shown the wisdom of those who undertook this work, which is the direct outgrowth of our Association.

I need not dilate upon the important features of the present programme; one is to be found in the reports of committees on the subjects to be brought up at the Dominion Conference of Fruit Growers to be held in Ottawa, in February, 1906. This Dominion Conference, embracing representatives from all parts of the Dominion, will be engaged in the consideration of many subjects of interest to fruit growers of the whole Dominion. It is therefore exceedingly important that you should give the subjects likely to come up at this Conference your careful consideration.

The second subject of very great importance is the discussion of the question of the "Canadian Tariff on Fruits." We must not forget that to us in a large measure is confided the interests of the fruit growers of the Province, and we would be recreant to our duty if we did not protect the interests of our constituents where they come in conflict with those of the munafacturers. It is, therefore, extremely desirable that we should appear before the Tariff Association with a united front and I would strongly urge that all minor differences be dropped and that we join upon the larger issues, so that we will not put upon those who depend on handicraftmanship, whether in the shop or on the farm, the whole burden of building up Canada.

Having said so much with reference to the work of the Association and the subjects which will immediately engage your attention, may I be permitted to call your attention to the general conditions which surround the fruit trade, and lay before you some of the broader problems that will call for serious consideration. As a preliminary I would like to rehearse very briefly the conditions of the fruit crop of the present year.

The season opened with an extraordinary show of bloom which, however, did not materialize in fruit. This failure is probably due to several causes. In some cases cold and prolonged rains were responsible, in others the trees had been weakened by a succession of heavy crops or by the severity of the last two or three winters.

It is scarcely creditable to the traditions of this Association that we have not attempted more systematically to investigate these phenomena, partly for the satisfaction that every intelligent fruit grower has in possessing himself of every fact in connection with his business irrespective of its commercial value, and partly with a view of discovering some means of securing more regular crops by perfect pollination.

The shortage in apples was not confined to Canada. Germany, France, Belgium, Great Britain, as well as the United States report a very serious year. I am sorry to have to report that in too many cases the profits that come from these higher prices will not go to the fruit grower, but to the apple operators who early in the season bought up a large percentage of the prospective crop. I cannot too strongly urge apple growers to refuse to dispose of their crop till market conditions are definitely known. One reason for this is that no ordinary grower can hope to have as definite knowledge of crop and market conditions as the dealer, and is therefore at a disadvantage. There is, however, a higher ground. All such transactions partake of the nature of gambling. The fruit grower, if he gets what is commercially called the best of the bargain, takes money for which he does not give an equivalent; if, on the other hand, he sells below the market price, he is making a present usually to a most unworthy recipient.

The peach growers have had a somewhat remarkable experience that illustrates well the value of fruit statistics. It is a matter of record that there has been a most serious loss in peach growing districts from winter-killing, dating from the memorable season of 1899. The new plantings have not kept pace with these losses and the increased consumption. This year the owners of good healthy trees had a full crop, in many cases much above the average, and so reported. Had the general public taken the fruit crop reports both of the Provincial and Dominion Departments of Agriculture, they would have been prepared to pay an increased but not exorbitant price for peaches, and would have taken all the Canadian crop and probably have imported an appreciable quantity. Unfortunately just at a critical time when the market was depressed with the remnants of the comparatively worthless early varieties, a report appeared in one or more of the Toronto papers, that was very widely copied to the effect that peaches were very plentiful and would be cheaper than apples. For want of a prompt denial, and a true statement of the facts, which should perhaps have been made by our Association, the public continued to expect cheap peaches, and refused to buy in full quantities when the fruit could have been obtained. This unfortunate report, whether it emanated from designing wholesale buyers or from the pen of a poorly qualified newspaper reporter, is responsible for the fact that many Canadian housewives will not serve peaches this winter on the regular bill of fare, as well as for the fact that peach growers have suffered from a depression of prices much below what was legitimate.

The plum crop was quite sufficient for local demands. The plum rot is yet a most insidious enemy, which our fruit growers have not yet learned to successfully combat. This, and the poor shipping qualities of most of our varieties, renders the extension of plum growing a most serious question.

Cherries of the Morello type have proved a paying crop. Small fruits of all kinds brought fair prices, but the conditions show that the local markets will not bear a much further extension of the industry.

The fruit trade of the Province was never in a more healthy condition. Having said so much, I feel it my duty to add that, though the outlook on the whole is excellent, there are very grave problems looming up for solution, problems arising, perhaps for the most part, from the very prosperity for which we are thankful. Speaking for a normal condition of things, the local markets are now well supplied. In a few cases it is safe to say that they are frequently much over-supplied, though a partial explanation of this may be in the inefficient methods of marketing.

Speaking particularly of small fruits, any further expansion must be in the direction of long distance markets. The education supplied, the varieties and the methods of doing business must, therefore, conform to the new conditions. One of the first lessons our fruit growers will have a learn in this extension of the small fruit business is that the conditions which surround the growing and shipping for local markets are totally unfit for the distant markets. No progress can be made until the radical distinction between the two markets is fully appreciated. The local markets will permit of comparatively soft fruit, which may be allowed to ripen beyond the maturity point upon the vines or bushes. The long distance market requires that the over-ripe fruit, probably the very best for the nearby market, shall be rigidly excluded from shipments to the long distance markets. In packages, too, and methods of packing a radical change must be made. The basket type, the very best for the local market, must give place to the box type of packages when the fruit is intended for distant markets. This difference in varieties, in the strictness of the grade, in packages will also correspond to a difference in methods of doing business. A local market, such for instance as that of the city of London, can very properly draw upon small growers, entirely independent of each other, located on all sides of the city and long distances apart, but if Ontario wishes to ship to Manitoba, Saskatchewan, Alberta, or even to Montreal, Quebec or the Maritime Provinces, it will not do to take the product of all these small and isolated growers. It will be positively necessary to encourage the growing of these products in large plantations and of concentrating the business at a few points where the growers will undertake to make a specialty of the long distance shipments. It appears to be an almost hopeless task to attempt to assemble the small lots of many different growers who have the local market for their chief outlet.

I admit at the present time we are lacking in varieties, and it will require some courage for growers who have been depending upon local markets as the outlet for two or three acres of strawberries or raspberries to branch out into a large plantation of ten or twenty acres with sole reference to the distant markets. Yet a change in this direction appears to be absolutely necessary.

The competitors which Ontario will have to face will be the American and British Columbia trade. It is needless to say that the American trade is already organized in this way, and British Columbia with her splendid capacity in soil and climate, has no other outlet than the distant markets. It is, therefore, extremely probable that the small fruit trade of British Columbia will be dependent upon long distance markets as is our apple trade and consequently British Columbia will not have the difficulty of educating her fruit growers in the requisite varieties, methods of packing and packages. Indeed, the small fruit trade of British Columbia is now far enough advanced to show conclusively that this is the actual condition, and therefore my statement is not one of prophesy but one of fact. I emphasize this particularly because I do not believe that the individual fruit grower appreciates the wide gulf there is between all the conditions of the local market and the distant market. Our fruit growers, perhaps, do not appreciate the fact that they have pratically no trade in the North-West in small fruits, and cannot have for the next two years at least as the beginning of the North-West trade must be in the making of the plantations.

To a somewhat less degree the same remarks apply to peaches and plums. New varieties are needed; different packages, different methods of packing and better transportation facilities. Nevertheless some of our present varieties of which there is an excess in normal years will form the nucleus of a profitable trade, if properly packed and carried. This will be brought out in the report of the St. Catharines' shipments of the present year. In addition, however, to such experimental shipments as these followed up by larger consignments on a commercial basis, the fact should not be lost sight of, that Ontario has the capacity of soil and climate to produce an enormous quantity of both peaches and plums, and that, therefore, though just now we are pausing between two great eras in the Ontario fruit trade, yet I think progressive men everywhere should confidently presume upon Canadian skill and intelligence and work out the problem of long distance shipments in both plums and peaches. To this end there should be every year, whether the crop here is small or large, regular trial shipments to Great Britain, that large and ever increasing market that must in the future even perhaps more than in the past be the recipient of our products. There is no reasonable doubt that, with the splendid steamship facilities that are now at the disposal of the fruit grower, we can land peaches in England in the best of condition, if we only have them. It is needless to say that we have not got them this year and may not have them next year, but five or ten years from now there is no reason why the export trade should not form a large proportion of the output of our peach orchards at least. The outlook is not quite so hopeful for plums, but even here fruit growers will have to look at the question in a broad light and appreciate the fact that the ramification of the trade in canned fruits, jams and jellies is one in which they, for the benefit of their particular business, will have to take a lively interest.

The problems in apple growing are somewhat different. We have developed the export trade until it completely overshadows the local trade, large as it is and has been. The steamship facilities and the demand for our fruit are excellent. There are, of course, problems of varieties, of orchard care and of internal and local transportation, but the pressing need at the present time is a better system of marketing. It is safe to say that such wasteful methods cannot be found in any other line outside the fruit trade. Do not misunderstand me—the middlemen who are actively engaged in this trade are excellent business men, and granted that the system they are working under is right, are above serious criticism; but it is the system I am finding fault with. The results of this bad system are to be noted in such facts as these: A barrel of apples, for which in a normal year the grower would be glad to receive one dollar, is shipped to England or Calgary and the consumer of it pays five dollars for it. Apply this same proportion to meats, cereals or dress-goods and where would the prices be? Of course, I do not lose sight of the perishable nature of fruit, and readily admit that as an excuse for many of the bad methods in selling. But the perishable nature of the fruit, the only argument for this most extraordinary discrepancy between the producing and consuming price, will not account for the system of buying which is in vogue in the greater part of Ontario. This system is responsible for much of the waste and the want of proper grading and packing and the serious deterioration between the picking and selling, for the exorbitant price of packages and for the unfortunate condition of affairs that will enable a number of unscrupulous men to succeed in getting a product without paying a proper price for it. Remember I cast no reflections upon the integrity of the large number of reputable apple dealers, who under great difficulties are doing a legitimate and perfectly honest business, but who, I am ready to assert, would be glad to see a better system introduced and would take up their work with renewed vigor under a better system. I, therefore, heartily commend the work which has been done by our Co-operative Committee, and sincerely trust that this Association will give to this movement every available assistance, both morally and financially.

Those of you who have intelligently followed the fruit trade will have noticed that in the change which now must take place from the local markets to the long distance markets, there comes a distinct question of the matter of varieties. This is so intertwined with the question of soil, climate, and modes of handling that we have reached the point I think when we can fairly ask the Government to bring to our aid an expert who can give his whole time to the development of the fruit industry of the Province. In this connection, it is a source of gratification to me to remember that twelve years ago Professor Craig, Mr. W. W. Hilborn, and myself were appointed a committee to draft an Experiment Station scheme for the Province. We worked earnestly together with the present Secretary of the Experiment Stations for many months, and the result appears in our report, which is the basis of the present scheme. Since that time I have been a Director of the Association, and therefore, of necessity, have had my attention directed officially to the working of these Experiment Stations. I have also served a term upon the Board of Control, and therefore feel that I am justified in taking my full share of the responsibility for the successes and failures which have attended this scheme. On the whole I feel that the Association may be very strongly congratulated upon the success which has attended the work of these Experiment Stations. At the same time I should be sorry to assume that they had reached the climax of their growth. It was never intended, and never thought at any particular stage, that the history of these Experiment Stations would be fixed, but time has very properly been given for the normal development, and we now appear to have reached the point where an onward step must be taken. Up to date the work of these Stations has practically been in the hands of private growers who have had business of their own to attend to, who have had little or no special training for work of this kind and who, therefore, claim no special fitness for anything but elementary work. The time has come when professional skill is needed. We have confined ourselves to a few variety tests, a few climatic tests, and have been eminently successful, but these points settled, we must look at the broader side of horticulture, and note what is being done in other countries for the development of new and profitable lines of fruit growing. We are in need of better varieties. Do not imagine that I am recommending more varieties for the average growers—I am simply asserting what everyone knows to be true, that of the few varieties that should be recommended to the average grower, there are none that unite all the virtues that we can imagine in a fruit. In some lines, indeed, we are particularly lacking here in Ontario. We are lacking particularly in peaches and plums, and the very work of the Experiment Stations themselves would appear to prove that what is needed is the development of new varieties that are specially suitable for our soil and climate.

This expert would be fully informed on the latest and best methods as practiced in the Experiment Stations of the Republic to the south of us, as well as in the Old Country, and could give his whole time to the fruit interests of this Province. This officer might very properly be attached to the Agricultural College, using the Experiment Stations with their varied soils and climates for the development of his plans, and supplementing the most excellent work of the present professor of horticulture. Unlike the present professor of horticulture he would not be hampered with the daily routine of class work, though his methods and results would be at the service of the students. This, however, is a matter of detail. His main task would be in developing at every corner and in every place the fruit interests of the Province.

The work of Director Groff in Gladioli, and the work of Burbank in all branches of horticulture, have shown how plastic in the hands of a master are the elements that go to make up plant growth. It would almost seem that be can mold these into any shape and form he desires. Species that for centuries were regarded as strictly limited in individuality have been intermixed and absolutely new creations in fruit have been made. With these notable examples before us it is not at all creditable to us that in nearly every case the standard varieties of our fruits are the work of chance. Fruit growers have done little or nothing apparently, either by hybridizing or selection, to develop the qualities which we so ardently desire in our productions. I, therefore, think that I am hazarding little in saying that I believe you will heartily endorse the appointment of someone who will step in at this critical juncture of the fruit industry of Ontario and assist in solving some of the problems presented to us.

The Department of Agriculture at Ottawa took charge of an exhibit of Ontario fruit for the Royal Horticultural Society in London, England, during December, 1904. This fruit was selected from the fruit shown at our first exhibition a year ago. It had been for some time in cold storage, it had been exhibited for a week upon the tables here, had been handled many times, and from the nature of the arrangements under which the halls were engaged the packing was necessarily imperfectly and hastily done. Notwithstanding all these drawbacks the fruit, shown no doubt to the best advantage by the care of Mr. W. A. MacKinnon, late Chief of the Fruit Division and now Canadian Commercial Agent at Bristol, was awarded a silver medal, which has been passed into the care of the Executive of this Association. This exhibition is held annually. It is needless to say that nowhere else could be gathered together a better informed and more influential class of visitors. It, therefore, should be a matter of pride for Ontario to have her fruit products properly represented before this most critical public. The Provinces of British Columbia and Nova Scotia, appreciating the opportunities of such an exhibition, have yearly sent most excellent exhibits, for which they have obtained awards which I am bound to say they richly deserved. I would, therefore, recommend that a committee be appointed, whose special duty would be to supervise a Provincial exhibit worthy of the Province producing nearly one-half of the fruit crop of the Dominion. This committee would require a small appropriation which very properly should be looked upon as a donation to the general public, inasmuch as the results of such an exhibit would accrue to the general public rather than to the fruit growers of the Province.

We are called upon at this meeting to note the death of one of our oldest members, Mr. D. W. Beadle. Mr. Beadle was the first editor of the "*Canadian Horticulturist*", and for many years successsfully conducted that journal. The son of one of the most prominent nurserymen of Canada, and himself a most enthusiastic horticulturist and student of nature, he was eminently fitted for such a duty. Until his strength failed him a few years ago he was one of the most regular attendants at our annual meetings, to which he contributed very liberally both in papers and in criticisms. His unlimited knowledge of varieties of all kinds, his wide reading and his extensive acquaintance with fruit men made him a most valuable member of our Association. Such a career as his cannot be fittingly dealt with in the limited space of an annual address. I have, therefore, suggested that a suitable biographical article be prepared and incorporated in the annual report for 1905.

The death of Mr. Beadle reminds me that in looking over old reports I note the names of several men who have made horticultural history, but unfortunately there has been no provision made for a systematic record of their lives or of the events in which they figure so largely. Though it may not be a matter strictly of dollars and cents, I nevertheless believe that no more valuable and interesting work can be undertaken by this Association than the making of such a record in the field of horticulture. It appears to me too that we are rich enough to be able to permanently mark important places, and to fittingly honor horticultural workers who have distinguished themselves to an extraordinary degree in connection with this Association or in this Province.

It is not creditable to us who live in these later days that it should be difficult to obtain accurate and definite information on the work of Mr. Arnold, Mr. Mills, Mr. Beadle, Mr. Dempsey, Mr. Jas. Dougal and many others. It ought to be still possible to trace with some accuracy the beginnings of several important fruit industries, and it is still possible to mark the location of fruit trees that have a history not less interesting than that of individuals. The original McIntosh Red apple tree is still standing, and its site should certainly not be left without a memorial. The possibilities of the Baxter are too great not to be worthy of attention, and the Ontario is a most creditable contribution by this Province. I am among the few who can claim to have sat under the original Windsor cherry tree, and can yet locate, I think, within a foot the exact spot where this tree grew. Many other names and fruits will suggest themselves to the older members of the Association. Enough has been said, I think, to indicate the work that can be done, and I commend to you the appointment of a standing committee whose duty it will be from year to year to make compilations, recommend memorials and provide for the care of suitable records in Provincial horticulture.

As the retiring President for the year 1905, I bid you welcome to our annual meeting, and, in doing so, may I couple with it an expression of my regret that I feel called upon to sever the close official relations with which this Association has honored me for the past fifteen years. Though I am retiring as an officer, be assured that the time will never come when I shall not be in hearty sympathy and in full accord with everything that can promote the industry of fruit growing in Ontario.

FRUIT MARKETS IN GREAT BRITAIN.

By W. T. Macoun, Horticulturist, Central Experimental Farm, Ottawa.

It was my pleasure during the past summer to spend about six weeks in Great Britain. During most of that time I was among those interested in fruit growing. I went there chiefly with the idea of taking a holiday, but, like most holidays, it was in reality just a change of work. This was my fifth visit, and each time I go there I am more favorably impressed with the country and the people. At first acquaintance one is apt to think that the people are behind the times, things move slowly there, and we are apt to compare the people and their methods unfavorably with our own. When, however, we begin to study the people and the conditions under which they live, we find that there is a system of living and a method of doing business which, perhaps, is unlike that of any other country in the world. England has built up her present prosperity on a very sound basis; her methods are very thorough, and, although they may be slow, yet in fifty or seventy-five years from now we in America may be sorry that we did not adopt the slower methods of Great Britain and build our external on surer foundations.

The more you see of the work being accomplished there in agriculture and horticulture, and all lines of business, the more you are convinced that they go into everything with great thoroughness. It is quite possible that some of their slowness in connection with horticulture is due to the land tenure system, owing to which there is not the same inducement for a fruit grower to plant as extensively as here or in the same way. But things are changing, and the people are getting a better control of the land. Particularly in Ireland, where I spent most of the time, the fruit growers are awakening, and I think we shall soon find that we have in that country a formidable competitor in the British apple market—not perhaps in the finer dessert varieties, but in those suited to more general use. I spent some time in going from one district to another, particularly in the county of Armagh. There I found that young orchards are being set out in hundreds of acres—orchards of ten, fifteen, twenty and twenty-five acres each. The trees run from three to six or seven years old. The practice over there is to grow apples on a dwarf stock. By using the dwarf stock they are able to get a crop of fruit earlier than we can in this country. The young trees come into bearing very early, and are soon profitable. The method I saw adopted, especially in the north of Ireland, was to plant the trees very close together, with small fruits between. The result, it seems to me, will be that when the trees should be producing most profitably they will be too close to enable the grower to cultivate crops between the rows, and without cultivation and sunlight the fruit produced will not be of the best quality. In this country, also, trees are often planted too closely.

I happened to be in Ireland just when the strawberries were in full season, and this fruit impressed me very favorably, even more so than in previous years. The perfection of their fruit is due partly to the fact that strawberries are grown under the hill system, which permits the fruit to get plenty of light and sunshine, and to thoroughly develop. The plantations are usually laid down for three to five years, and the best crop is borne the fourth year after planting. The difficulty we experience in this Province with the hill system is that there is a slight heaving of the plant every winter, as a result of which the crown dries out and the crop produced is not large. Over there they have no trouble in this regard. Owing to the hardness of the surface of the soil there the fruit lies on the ground without injury.

It was found, as in Canada, that the varieties of poor or medium quality are often the most productive, and to the average grower the most profitable; hence one has to test Royal Sovereign or some other good variety to get a right idea of what can be produced. The best berries are finer in flavor than ours, are also very large, no doubt principally due to the fact that the plants are grown on the hill system, the plants being from 22 to 24 inches apart each way. From three to five crops are usually taken from a plantation. The price of strawberries was, on the whole, lower than in Canada, varying from 2d. to 6d. per box.

In going through the country one is very much struck with the difficulty the farmers and fruit growers experience in working the soil. Cultivation is child's play here compared with what it is there, as our frosts loosen the soil so much that it is comparatively easy to work. Over there the rains which prevail for several months during the winter compact the soil, and in the spring it is in a terribly sodden condition. By the time that the crops are off the ground in the summer you would be surprised to find how hard the surface of the soil is. I think we may be thankful for the ease with which our land is cultivated.

Another factor which will enable fruit growers over there to compete with us is the cheapness of labor. My brother-in-law, who is a farmer there, employs twelve or thirteen men on a hundred and twenty-five acre farm, paying them about thirty cents per day, although some get as high as fifty cents. He has a Massey-Harris binder on his farm, but he finds it just about as cheap to bind his grain by means of hand labor. From this you will form some idea of what we have to compete with in the way of fruit growing. The Department of Agriculture for Ireland is doing a great work for the Irish people, and this, perhaps, is one of the reasons why their horticulture is developing so rapidly.

It was my pleasure to visit several of the horticultural colleges in England, and to investigate their methods of teaching. At Swanley, in Kent, there is a Girls' Horticultural School. There are about sixty-four students in attendance at the present time. No men are admitted. The tuition fee is very high, and this seems to be the principal objection to the Institution. The students are come from a good class. They are thoroughly trained in all branches of horticulture, and they are able to go out from that college and take positions as assistants in gardens, greenhouses, nurseries, etc. I saw a young lady directing the operations of two men in the botanical gardens in Dublin, a proceeding which strikes one as somewhat unusual. You will see, therefore, that over there they are giving young women an opportunity of studying scientific horticulture, a plan which, I think, we might very well follow in this country. I also visited the horticultural college at Reading, where they have students of both sexes. I found that they are doing good work there.

Mr. McNeill has brought up the subject of the value of experimental work in horticulture. While in England I visited an experimental farm of about forty-five acres, conducted by the Duke of Bedford. I do not think there is any station in America that compares with it for thoroughness of methods and range of experiments. They have about eighty different experiments in methods of cultivation. They have a number of varieties growing side by side, and each receives a different method of treatment. One of the most striking results I noticed was the difference in trees grown in sod and under cultivation. Some were planted in sod from the beginning; others were cultivated for one year and then sodded down; others for two years; still others for three years, etc., and so on. The trees that were planted in sod grew and developed very slowly, and are producing nothing to speak of. Those sodded down three or four years after planting are in a semi-dwarf condition, but those that have received clean cultivation from the beginning are strong, thrifty trees, and producing good crops. I also observed experiments in winter and summer pruning, heading back one-half and three-quarters and without any pruning at all.

I think it will well repay anyone to spend a few weeks in the Old Country in order to study the methods and the people. My judgment is that over there they give more attention to home life, and to subjects that tend towards culture and refinement. In this country we are liable to make our lives too narrow, we spend too much time at our business and neglect our home life, and also to study and compare the results of the labors of others. In respect to these things I think that the people in the old country do better than we do.

CO-OPERATION IN FRUIT GROWING.

By A. N. Brown, Wyoming, Delaware.

I had the pleasure of meeting a number of the members of this Association at a series of meetings held in the Niagara district last March, at which I had the privilege of being present. I am glad to have this opportunity of renewing your acquaintance, and also of making the acquaintance of the Society as a whole. I find that I am on the programme to speak on the subject of "Co-operation in Fruit Growing," but, as I was not acquainted with this fact until a short time ago, I will not undertake to confine myself wholly to the subject in hand.

We find that all classes of citizens, no matter in what profession or industry they may be operating, are to-day co-operating for their own welfare—merchants, lawyers, mechanics, even ministers have their associations. They co-operate for their own better development and for the accomplishment of the things which will aid them in their particular lines. Why does not the fruit grower co-operate in his own behalf? If all others have to co-operate in order to protect themselves and to develop their business, is it not even more needful that the agriculturist and the fruit grower should adopt the same method? In their case it is all the more necessary because of the fact that they have to contend with natural forces to an extent that is not met by those engaged in any other industry.

In studying the question we find that the chief aim of co-operative effort is to secure the proper marketing of the product. If there is one feature in which we, as fruit growers, need co-operation, it is that of marketing. We need co-operation and uniformity in other lines, but more than anything else, we need a fuller knowledge and a more united effort in the way of marketing our product. If there is one thing we are remiss in, as producers, it is in this regard. Manufacturers have little to say at their gatherings as to the processes connected with the manufacture of their goods, but they are continually discussing the market end of their business. Just as soon as the manufacturer finds that the shelves of the merchant and the warehouses are over-supplied with the article he manufactures, he immediately stops the production of that article for a time. On the other hand, the farmer cannot control production, and, consequently, the farmer, and particularly the fruit grower, ought to co-operate. What can we accomplish as fruit growers by co-operation? One of the first objects should be to find a market, and to place our goods on that market in such a way as to attract the consumer. Unless we attract the consumer we cannot realize good prices. Then we require to study the question of transportation in all its phases—the quickest means of reaching the destination with our fruit, the cost of transporting it, the size and shape of the package in which it is marketed.

The individual has ceased in these days to be an important factor in nearly every line of human activity. It is only by united effort that men are able to accomplish anything to-day. We have to co-operate with our Government, and it co-operates with us. Some wonderful results have been secured to our people by the co-operation of the Government with the farmer, by means of the Farmers' Institutes, experiment stations, and the literature distributed. These educational influences have increased the value of the products of the farm to a remarkable extent. I observe that similar results have been accomplished in this country by the same means. Our people have been instructed as to how to grow their crops, and how to market them. Secretary Wilson states that the value of the agricultural products of the United States for 1903 was five billions of dollars. That means that the farms of the United States produced in that year four times the value of our manufactures; that the value of these products for one year was equal to the value of the output of all the gold mines in America since the days of Columbus; that it was six and one-half times greater than the stock in the National Bank; that it was three and one-half times greater than the capitalization of all the railroads; and that the value of the product for one month in 1903 was equal to the interest on our national debt. How has this been done if not through the agencies I have named? In 1903 there were 3,700 Farmers' Institute meetings held, with a total of 10,000 sessions. These meetings were addressed by trained experts, and one million people were reached in this way. Who can measure the educational influence that this agency would have upon production? The Department of Agriculture at Washington has 5,000 trained experts at its command, and distributes twelve million copies of the various reports and bulletins, prepared as a result of their researches, which touch every phase of the industry.

But our Government does still more for the farmer than this. In 1903 when the dread disease known as the foot-and-mouth disease broke out, by the expenditure of a million and a quarter they saved over five hundred millions to the cattle men. We lose every year seven hundred and eighty-five millions of dollars through insect pests which destroy our grain and fruit. In 1903 Washington spent six hundred thousand dollars in this connection, and saved over three hundred million dollars to the grower.

This wonderful showing has been brought about by co-operation on the part of the Government and the people. When the Government helps the agricultural class it is simply helping that class upon which the Government depends. This is not a matter of paternalism, because, when agriculture ceases, humanity will almost instantly cease to exist. Think what it would mean to stop the transportation of food products to the city of New York for even a single day. Discontinue it for a week, and the streets would be filled with perishing humanity. Agriculture is the basis not only of our wealth, but it is the one thing that must exist in order that humanity may continue to exist. We need our manufactures, but you might stop every manufacturing industry in the country and leave us agriculture, and our people would still support themselves and be, in a sense, prosperous and happy.

As to what fruit growers may accomplish in a special way by co-operation: During the past twenty-seven years we have had quite a number of co-operative associations in Maryland, Delaware and the seaboard states. For seventeen years continuously I have been secretary of the leading association there. We have done one thing that has been of more value to us than anything else, namely, we have succeeded in bringing the cash buyer of our product to our doors. We have drummed for our trade just as every other business man in this country is drumming for his trade to-day, by sending out our representatives and soliciting business from the men in the various cities who are dealing in fruit products. These men now come to us and buy our fruit at our door, and, after that, our responsibility in the matter ends. We consider that, having planted our trees and brought them to a producing age, having picked the crop and packed it for shipment, and delivered it at the railroad station, we have followed it with expense about as far as we are called upon to follow it.

In 1904 we shipped from my station 210,000 baskets of peaches, and not a single carload was sent to a commission merchant. Every basket was sold for spot cash at the railroad. This year we loaded 218 car lots of Keiffer pears, and every one was sold in the same way. We have two stations on the main line of the Delaware railroad, and last year we loaded 62 carloads of fruit every day for several days, and the whole of it was purchased from us f.o.b. This is an instance of what may be accomplished by co-operation; but there are other things almost as important. We have secured, for example, a special fast service for our peach shipments on the railroad. We have solid peach trains, and when they are running the passenger trains are side-tracked to give them right-of-way. During the pear season, pears that are loaded in peach cars go in the same classification, and pay the same rate: and it is the same with apples. We also obtained important changes in the classification of our fruit by the railroad, which could not have been secured except through a powerful organization such as our own. We did not stop with the General Traffic Manager, but went to the Classification Committee of the National Traffic Association in New York, and our negotiations lasted for a period of several years. The first year we accomplished nothing. Amongst other things we desired that pears should be classified the same as apples. Finally, they compromised by permitting us to bill our pears as "Keiffer apples," and, in that way, we obtained the lower rating for them.

As another instance of what may be accomplished by co-operation. I may say that there are two counties in Virginia which produce, as their chief crops, potatoes, both Irish and sweet, and also cabbage and kale. There were times when they could secure not more than fifty cents a barrel for potatoes, and when a glut was on they did not pay for shipment. They finally decided to form an association, which resulted in the organization of the Eastern Shore Potato Exchange. They have been organized for four years, and are to-day handling the crop on a business-like basis. They have increased the value of the product to the grower by one hundred per cent., and they sell every carload right at their station. They have thirty-one inspectors, and every barrel of potatoes they ship is of a certain grade, and bears the stamp of the Association. The Association is a responsible body, and guarantees every carload sold. Last year they handled 350,000 barrels of potatoes, and their telegraph bill, incurred in obtaining information on the markets, was $3,200. They can sell their product, while I, as an individual grower, might have a carload on the market and not be able to dispose of it at all. They have built up a reputation so that the consumer may rely upon their brand. As a result of their operations they have increased the value of the land one hundred per cent., and have built up a profitable business. I could give you instance after instance of this kind to show what our fruit and vegetable growers have accomplished by co-operation, and not one of these advantages could have been secured by individual effort. The same is true of similar organizations in the Mississippi Valley and in California. Seventy-five per cent. of the fruit growers of the State of California belong to the California Fruit Growers' Association. Every package of fruit grown by these men bears the stamp of the Association, and every sample of fruit in that package is a perfect specimen. They could not crowd the eastern fruit grower out of the eastern market, if it were not for their superior method of packing, which can be accomplished only by systematic co-operation. Last year the Association notified every one of its members that if they did not spray their trees the Association would not purchase their fruit in the fall. Some of them said that they would not be made to spray if they did not want to, and they did not spray. Consequently, in the fall, the Association refused to take their fruit, and they were obliged to dispose of it on the local market at such prices as could be obtained.

I think that both in this country and in the United States we are on the eve of great things as a result of co-operative effort, so far as the farmers and fruit growers are concerned. When I refer to the two countries, I like to speak of them as being one, because I believe that the destiny of the human race is in the hands of the two great English-speaking countries, Great Britain and America. I, for one, should like to see reciprocal trade between the two countries.

A Member: You need educating on that line on the other side.

Mr. Brown: We do, and on many other lines. Take our experimental station work,—a great deal of valuable information has been secured through this medium, and yet the experimental station idea is in a very crude form as yet. I think the experiment stations have missed the mark to some extent, because their experiments have not been conducted along the lines of average conditions. I can take a calf or a cow or a fruit tree, and, by giving it special attention and great care, can produce a result which I cannot secure by taking five hundred trees or calves. I have surrounded the individual with conditions that cannot be applied to the five hundred. The Experiment Station should conduct its work on such lines as will meet the average condition of the fruit grower. I have a neighbor who sold $1,640 worth of apples from a single acre. If I told you that the fruit growers of Delaware could secure that per acre, you would think me a fool; it is a possibility that happens once in a while and does not by an means represent average conditions. It is necessary that our Experiment Stations should perform their work on a larger scale. They cannot secure average conditions by planting twenty different varieties in twenty rows, each one hundred feet long. In my own State eighty per cent. of the soil is a deep, rich, sandy loam with a red clay sub-soil. But in the northern section there is considerable hilly, rocky land, where the conditions are entirely different to what maintain in the more favored portion. Strange to say, they located the station in the hilly, rocky portion, and are conducting experiments there which are practically valueless for the rest of the State. The latest development of the Experiment Station work is to take a fruit orchard of twenty, forty or fifty acres as the basis for their investigations. The same principle is being applied in experimenting with corn, and, as an instance of what may be accomplished by the improvement of seed, I would point out that if the germinating power of our seed corn could be increased fifteen per cent. (and this would not be a very difficult thing to accomplish) it would add one hundred and twenty million dollars to the value of the corn crop of the United States. We need more co-operation between the Government and the people. We need the aid of the Government experiments, and the Government is not doing wrong to support an industry that produces the wealth of the country.

I do not think it likely that in the future we shall see any large over-production by the farmer. The tendency of the people of recent years has been to leave the farm for the city, so that to-day there are not as many men engaged in the cultivation of the soil in the United States as there were formerly. In spite of this fact, however, our knowledge of crop production and the handling of the soil has been greatly increased, so that we are producing more per acre than was formerly the case, and the end is not yet. In 1893 C. Wood Davis made the prediction that the consumption of wheat had caught up to the production, and that the American wheat grower would never see the price fall below one dollar per bushel. Since that time there have been occasions when wheat has been cheaper than it ever was previous to this statement. In making his calculations he had omitted a very important factor. He had failed to recognize that there were forces at work which were teaching our farmers to increase the output per acre. The farmer to-day, who attends the Institute and studies the characteristics of his crop and of the soil, knows where his soil is deficient, and how to supply the deficiency, if one exists. He is an educated man, and is all the time obtaining better results.

The same is true of the results that have been secured in connection with the fruit crop by the introduction of spraying. In the future of fruit growing it is going to be even more surely a survival of the fittest than in some other branches of agricultural effort. In the future the orchardist must learn to handle his trees with such intelligence as to grow quality into his fruit. Our vegetable growers have learned some of the possibilities in this direction, and I maintain that it is just as practicable to grow quality in an apple as in a cabbage.

The only way by which the fruit growers of Ontario can accomplish great results is to stand together, and work together. We have a striking illustration of this in the Japanese; on the one hand, we saw a people co-opering with their government in wealth and patriotism. Opposed to them, we saw a nation where the very reverse of these conditions prevailed. We are all acquainted with the result. Wherever men unite for a purpose they will accomplish results.

HYBRIDIZING.

By H. H. Groff, Simcoe.

I have been asked by your chairman to say a few words this evening regarding my work as a hybridist. It would be most undiplomatic at this late hour to make my remarks at all extended. I desire first to thank you for the honor done me in electing me one of your directors. While not a fruit-grower, my work in connection with my special line of horticulture has not been entirely fruitless. It has attracted attention in all parts of the world, while remaining, I must confess, comparatively little known in Canada. It is not possible for me to say much about plant improvement by hybridization in the short time at my disposal. The chief mistake made by plant breeders is that they have overlooked the fact that the biology of plants and animals is practically identical. They have gone about the work of hybridizing or plant breeding in a manner directly opposite to that followed by successful animal breeders. For this reason progress has not been as marked as it would otherwise have been. The science of plant breeding, as well as breeding of all kinds, is attracting great attention at the present time. More progress has been made within the past century than in the whole of the history of horticulture previous to that time. As a field of work it is absolutely limitless. The amount of progress any experimeter will make depends greatly on the concentration and activity he will bring to bear on a certain limited number of lines of investigation. Mr. Burbank has been very much misunderstood, and is at the present moment being severely criticized because of statements made in regard to his work by writers in the public press and in magazines. I am perfectly in sympathy with the sentiments he holds, and I am certain he would not have made many of the statements in regard to his work which are attributed to him.

The most advanced scientific thought of the present moment is that the creation of new types is not the result of gradual work, step by step through a long process of selection, as it was formerly supposed to be. It has been fully demonstrated that by hybridization you may create such a disturbance in the vital forces of the plant that breaks appear and new types are the result, from which we are able to work on more advanced lines. This principle is now accepted by the most advanced leaders of thought. It is a solution of the problem as to how so many different types of plants and animals come to exist in the world at the present time. It was not by gradual development and change, but the outcome of the sudden changes which are brought about as a result of crosses in nature. This work can be hastened by the scientific hybridizer. By his efforts we can obtain more variations in a few years than nature could obtain in countless ages. We draw upon the resources of the past and are rushing into the boundless æons of the future. We bridge over the space between by the performance of a single act, scientific hybridization.

REPORT OF COMMITTEE ON REVISION OF CONSTITUTION.

The draft of a new constitution was presented by the Committee appointed for the purpose, and taken up clause by clause for adoption. Considerable discussion took place in regard to the name of the Association. The Committee recommended that the old name of the Fruit Growers' Association of Ontario be continued. A resolution was moved by Mr. R. B. Whyte that the Association be called the Ontario Horticultural Association. Mr. Sherrington and others declared, however, that the old name should, for a number of reasons, be maintained. In the first place, it was known not only all over the American continent, but in Europe as well, and it would take some time to secure a like recognition for the organization under another title. They further pointed out that the Association under its present name obtained a standing before the Railway Commission, the railway companies and the Government, which it might not be able to hold under the name suggested as a substitute. It was further stated that the Association was largely commercial in its objects, that the name under which it has been known represented the commercial idea, and that the fruit-growing industry was of sufficient importance to demand an organization devoted solely to the promotion of the commercial fruit-growing interests. It was accordingly moved by Mr. W. L. Smith, seconded by Mr. Sherrington, that the clause in the report be adopted and that the old name be retained. Mr. Groff pointed out that the question to be decided was whether the Association wished to incorporate other kindred interests with that of fruit-growing, as the broad field of horticulture covered those interests, and, as he understood it, the object of the Association was to conserve them all. Mr. Caston stated that a Horticultural Association would in all probability be formed just as had been the case with the Vegetable Growers. If that were done, he did not see what object was to be gained in changing the Society's name. Mr. Woolverton suggested that it would be desirable if the kindred Associations would elect delegates to a central committee to take charge of the Show programme.

Mr. Smith's motion was then put and declared carried.

On motion the words "Fruit and other horticultural products" were added to sub-section E of the preamble.

On motion it was resolved that the word "Society" be added after the word Association at the end of the third line so as to cover local horticultural societies.

On motion it was resolved that the word "shall" be changed to "may" in section 19.

On motion it was resolved that the word "or" be changed to "and" in section 22a, and that section 22b be amended to read "ten days;" that in 22d the words "an officers' meeting or" be struck out.

On motion, resolved that in section 23a ten members should form a quorum.

It was moved by Mr. W. L. Stevens that section 25 be so amended as to provide that the affiliation fee for each Society should be $5.00 and that subscription to the *Horticulturist* should be optional. Mr. Lick moved in amendment that the privileges of membership should be allowed for the 25 cents, not to include the *Horticulturist*. It was moved in further amendment by Mr. Smith that sections 26, 27 and 28 be referred back to the Committee for consideration, and that their report be presented on the day following.

Mr. Stevens withdrew his resolution and seconded the amendment, which was carried.

At a subsequent session, Mr. Bunting presented the Committee's amended report on sections 26, 27 and 28, and moved its adoption. He said: "There seems to be some little difficulty as to the relationship between the affiliated societies and the parent body, and it was with a desire to harmonize any differences of opinion that may have arisen that the report was referred back to your Committee. Sections 24 to 28 inclusive have to do with this matter. In connection with section 25, the point was, I think, raised that at the present time the local societies were not properly represented at the annual meetings of the Provincial Association, and that some provision should be made whereby these societies might be represented by accredited delegates. In addition the objection was raised that in some horticultural societies their members might not care to be compelled to pay for *The Canadian Horticulturist*, the official organ of the Association. I think, however, this objection has been waived, and your Committee therefore recommend that the section be changed to read as follows: 'That the membership fee shall be the sum of $1 per annum, payable in advance, that of this amount the local Secretary shall transmit 75 cents per member to the parent Society, the payment of which shall entitle each member to receive all the privileges and advantages of membership in this Association.' That section 27 be amended to read that 'Each affiliated society is expected to send at least one delegate to the annual meeting of this Association for each fifty or more members, and that the expenses of said delegates shall be paid by the parent Association.

MR. McNEILL: The purpose of the Committee is to provide a means whereby local societies may be brought into closer touch with the central Association. In addition to the privilege of sending a delegate free of charge, each member of an affiliated society will become a subscriber to *The Canadian Horticulturist* and receive a copy of the annual report; and any other advantages the Association may have to offer will be at the disposal of the affiliated societies.

Mr. Thompson suggested that expenses should apply to actual transportation expenses only and moved a resolution to that effect.

MR. BUNTING: The point raised was thoroughly discussed by your Committee last evening. Some of the members were of the opinion that the expenses of delegates should be confined to actual travelling expenses. It was pointed out, however, that in addition to transportation expenses, only the actual expenses of the delegates while attending the sessions of the Convention would properly be chargeable to the Association. If delegates were here during the entire week, the amount paid would be made equivalent to the actual time occupied by the sessions of the organizations which they were authorized to attend. On the standing vote the amendment was declared lost and the original motion carried.

The remaining clauses having been adopted by resolution, Mr. T. H. Race moved, seconded by Mr. Harold Jones of Maitland, That the Constitution, as adopted clause by clause and amended, be received and adopted as a whole. Carried.

(See Appendix "E" for Constitution in full.)

COMMITTEES.

NOMINATING COMMITTEE. W. H. Bunting, St. Catharines; D. Johntson, Forest; H. H. Groff, Simcoe.

COMMITTEE ON FRUIT EXHIBITS. L. Woolverton, Grimsby; L. B. Rice, Michigan; A. E. Sherrington, Walkerton.

COMMITTEE ON RESOLUTIONS. W. L. Smith, Toronto; Harold Jones, Maitland; H. H. Groff, Simcoe.

INTRODUCTION OF DELEGATES.

Mr. RICE, a delegate from the State Horticultural Society of Michigan, said that his Society sent its best regards to the Ontario Society, which they desired him to present. "We are anxious that you should send at least two delegates to our Convention at Grand Rapids. Your delegates are always welcome and are made members of our Society for the time being. Our Society is in sympathy with yours and we wish very much that there could be a levelling down instead of a levelling up of the tariff wall between the two countries. The levelling up process has been going on too long. The little selfish idea of building up the industry of one man or one company at the expense of the nation is too small for a real horticulturist to entertain. We in Michigan know that in any levelling down process your growers will have the advantage of ours in our eastern markets, but the interests of the nation are everything and local interests should not be considered. God made the country for the people of the country and not for any one individual or any one company." Mr. Rice stated further that he was a little surprised at the demands made before the Tariff Commission by those interested in vegetable growing when the southern country could supply Canada with all the early fruits and vegetables this country could need. "Why should you not accept them? Why should you raise a tariff wall to keep out these products and then build greenhouses in which to grow them? Do not ask that everyone be taxed for your individual good."

Mr. Norman Jack, representing the Pomological and Fruit Growing Society of the Province of Quebec, was introduced. In a short address he said that he brought with him the greetings of the Society he represented, and of the fruit-growers of the Province of Quebec. The fruit-growing industry was considerably farther advanced in Ontario than in his Province. At the same time they had made progress in many lines. In his own section many men had been spraying for fifteen years, nevertheless there were people there yet who asked him whether he thought spraying was an advantage. The question of varieties most suitable for the locality, the best location, soil and methods of culture, the best methods of packing and shipping to market were questions which were all receiving attention. They had not yet taken the more difficult problems in hand such as co-operation and transportation.

In reference to the culture of the apple orchard, he thought it was a mistake to lay down hard and fast rules in respect to clean cultivation or grass cultivation. In his own district there was hardly ever a time when they had not an abundance of moisture. In the summers of 1903 and 1904, when the drought was so prevalent, their orchards had sufficient moisture. Under the circumstances, therefore, clean cultivation did not seem desirable in that section. Mr. Jack extended the members of the Association a hearty invitation to attend the annual meeting of his Society.

Mr. Harold Jones pointed out that the climate of the two Provinces where they adjoined was identical. He did not consider the question of orchard cultivation had been given sufficient attention. He said "General instructions are given to Ontario orchardists to cultivate often; to keep the orchard clean cultivated say to the first of August and then sow a cover crop. In the east, fruit trees were subjected to very low temperatures. If we follow the plan outlined, the new growth would begin the winter in a green, sappy and immature condition, which generally results in severe loss from winter killing either to the bud, the bark, or the whole tree. My experience has been that in the lower St. Lawrence valley we must use a great deal of caution and intelligence in regard to the cultivation of orchards. We must develop the fruit bud and the wood growth early in the month of June in order to guard against loss of this kind. The fruit bud is fully developed by about June 24th, but the rest of the summer is required to ripen it and dry it out, so that a temperature of 40 degrees below zero will not affect it. Clean cultivation is necessary in order that the trees and the crop may be kept up to normal condition, but to those living in that section, my advice is to cease cultivation by July 1st and then plant the cover crop. In that way we can carry our orchards past the danger of winter killing and bud injury."

FRUIT-GROWING IN ALGOMA.

By Wm. Harris, Day Mills, Algoma.

It may interest you to know of my experience in fruit-growing in Ontario. I settled in the Township of Morris in 1853, and planted the first orchard in Morris in 1858. I planted trees from the Holton Nursery, at Hamilton, of the following kinds: Early Harvest, Maiden's Blush, Colvert, all the family of Pippins, three kinds of Russet, Greenings, Bellefleur, King, Northern Spy, Wagener, and some others. The Baldwin was a failure; all the rest did well.

I settled here in 1879, and planted fifty trees in 1881, the same kind as I had in Huron. Most of them got winter killed. The next kinds I planted were of the following varieties, and all did well: Yellow Transparent, Tetofsky, Duchess, Wealthy, McIntosh Red, Scott's Winter, Alexander, Northern Spy, Longfield, Gideon, Pewaukee, Ben Davis, and Snow. All of these did well except the Northern Spy and Snow, one of each, which the borers killed.

There are many other hardy kinds that will do well here with proper care. "Sun-scald" has injured many trees in Algoma, and many settlers have lost their trees with the borers. Sun-scald never injured any of my trees until last spring. My neighbor has some very fine fruit from Wolf River, Gipsy Queen, and Salome. Plum trees have been a failure, owing to winter killing. What we want most are some hardy plums and pears.

NEW IDEAS IN SPRAYING.

By A. N. Brown, Wyoming, Delaware.

I want this afternoon to talk to you as to what has occurred on our side of the line and what we find ourselves up against, rather than to present any new ideas on the subject of spraying, which the title of my address would indicate I was about to do. At the same time I will bring to your notice any improvements that have been observed in connection with my own work. When I state that some 25,000 gallons of material were sprayed last year under my directions, you will admit that I should have had an opportunity for gaining some little knowledge and experience. My business last year brought me into contact with the leading fruit growers of the eastern seaboard States. They are among the most intelligent and progressive men in the business. I made it a point to observe their methods and to learn all I could, because I am asked to go before meetings like this, and I try to carry with me some of the information which I obtain from these men. I try not only to learn more about it for myself, but to be able to impart the information to others. I hope I shall strengthen some of you as to the necessity of spraying.

The worst pest that we are now troubled with in our part of the country is the San José Scale. It has extended over a larger area in the States this year than ever before, and it is worse on orchards that have been treated for seven or eight years than ever before. We have been spraying for San José Scale for about ten years, and after all the work and energy expended, it begins to look as though we were worse off than at the beginning. I can take you to orchards where until last season they were able to control the pest; they are now entirely covered with scale. There are two reasons for this. We had a very wet season in the Atlantic Coast States, and one in which the humidity was excessive during the summer. Both conditions appear to nullify the effect of the materials used in treating the scale. That, I think, had something to do with it, but there was another reason and it is the more important of the two. We find that we have, in the badly infested sections, the existence of scale on our shade trees and ornamentals in the towns and cities, and on the forest trees in the country. We have been claiming for several years that scale existed on these trees, but as it takes two or three years before the scale becomes established and is really serious, these trees have not been treated. It has spread to such an extent on these trees, however, that they are now literally covered with it. If you had fire all around the buildings on your farm, you would be correct in concluding that it would eventually spread to them and that they would be consumed. That is precisely the situation in regard to the scale. Our growers found last season that after having sprayed their orchards in March and April as they had been accustomed to do, their trees were reinfested later in the season from the infested trees that were all around them. The birds flying from these infested trees to the trees in our orchards carried the scale with them, and this fall we found that our trees were covered with running larvæ and recently encrusted scale. This state of affairs teaches us that we must spray our trees, not only in the spring, but at some other season of the year as well, preferably I think in the fall. In my neighborhood everybody is now getting ready for fall spraying. The condition I have outlined above is the prevailing one in twelve States. I find that it exists in the largest fruit orchards in those States, running from fifty to a thousand acres.

Another thought presents itself in this connection, which is, that when we spray in the fall, we are spraying the scale when it is least resistant. Formerly the whole work was done in March and April, when it was most resistant. If we spray now, we shall catch the running larvæ and those insects on which the incrustation is still soft, and of course, the scale is much more effectively treated at these stages of development than later on. We have this additional compensation also that, if we do not succeed in killing the scale in the fall spraying, we shall have another chance at it before the breeding season begins in the spring. For the reasons I have indicated, our largest growers have concluded that they will have to spray at least twice a year for the scale.

Some one may ask why we do not spray in the summer season. We have not adopted this method for the reason, first that we do not care to apply the solutions used to our fruit, and second, because it is very difficult to cover every portion of the tree when it is in foliage. We therefore concluded that the better way was to spray immediately after the leaves drop. This we consider a new departure in our section. Our growers are compelled to fight the scale because of the general infestation all around them. Dr. Smith told me recently that there was not a single town, village or municipality in the State of New Jersey but was thoroughly infested, and that he was recommending the municipal authorities to take the matter up and spray vigorously. Professor Surface says that precisely the same condition of affairs prevails in Pennsylvania. That State is doing more to destroy the scale than any other Government that I know of. They have inaugurated a movement that is simply wonderful. At the last session of the Legislature they appropriated $35,000 to the agricultural department of the State to be expended in demonstrations in spraying in every fruit growing community in the State. The delegations follow the plan of first identify-ing the particular pests that are most troublesome in a locality, after which they teach the growers how to make and apply the various mixtures to be used in treating them, just as the demonstrators of cereal foods go up and down the country demonstrating their products. In order to properly inaugurate this movement and put it on a practical footing, they compelled their twenty-one orchard inspectors to take a special course at the State Agricultural College so as to instruct them precisely how the mixture should be made and applied. They were then given pumps and machinery and put to work. They spend two days in each district. On the first day the inspector visits the largest orchards, identifies the pest by taking cuttings of infested branches. These cuttings he takes to a public meeting, held in the forenoon of the second day. At this meeting he submits the specimens to examination under a compound microscope to those gathered, so that every grower may examine the pest and acquaint himself with its characteristics. After the inspectors have described to the people the nature of the pest and the methods of treating it, they proceed in the afternoon to the orchard and mix and apply their solutions. The eyes of every State of the union are now on Pennsylvania to see how she will succeed in her efforts. The fight against the San José Scale is a fearful one and if we do not succeed, we shall have to go out of the fruit business. You in Ontario may not have reached the stage, in any of the districts where scale is found, where the reinfestation I have described takes place, but sooner or later, my belief is, a similar state of affairs will be found here.

I may say that in Pennsylvania Prof. Surface sprays only with the boiled lime, sulphur and salt solution. I am a little surprised at this , because experiments conducted at Geneva and Cornell show that the result of spraying with this mixture in the fall is that the trees throw from twenty to forty per cent. of their buds. It would be advisable to leave the salt out of it for fall spraying. There is a similar danger in spraying with crude petroleum in the fall. I am not here to advocate any of the combination washes but we have about concluded that they are the safest to use for fall spraying. There are many of these on the market, but there are only two so far as I know that we have any particular confidence in. I refer to Kiloscale and Scalecide. Both these washes are similar in their results, although the latter is perhaps a little the stronger, and it is almost forty per cent. cheaper; in fact it is no more expensive than lime, sulphur and salt. It is absolutely soluble in water, mixes instantly, and will not separate after it is mixed. It was sent out to twenty-one States last spring. I have seen reports from most of them made to the Pratt Company in New York, and all stated that it was the most effective of the washes used. My own experience with it has been very satisfactory. It is being applied to all my trees now.

Kerosene Limoid has proved very ineffective in our State. This is attributed to the fact that the lime used was a low grade process lime. Mr. Macoun at Ottawa overcame the difficulty by employing a coarse grade of flour, and it worked very nicely. I should like to ask Mr. Macoun whether he calculated the exact cost of the mixture?

Mr. Macoun: We found it very little more expensive, but we find freshly slaked lime just as effective.

Mr. Brown: Process lime has been recommended for the making of Bordeaux, but I do not intend to use it for that purpose, nor do I intend to slake lime for a stock solution and leave it standing. In this connection there is a point that should be noted. On one farm in New Jersey a man ruined his entire apple crop by the application of Bordeaux. I had recommended it to him for the codling moth. I told him how to mix it and cautioned him against wet seasons, etc. He made the mixture with equal amounts of lime and bluestone and, as it was a wet season, his apples, which were Staymen Winesaps, were scalded with the material. He overlooked the fact that, as it was a wet season, more lime was required to neutralize the acidity of the bluestone. I used this season twelve pounds of lime to eight of bluestone right along. I find that a great many people burned their apples on this account.

In our fight against the scale we intend to use oil combinations this fall. While the lime, sulphur and salt solution is perhaps the best remedy that can be used against the scale, I do not suppose there is a single grower who cares to contemplate the prospect of mixing and applying this solution during the rest of his business career. Consequently I am encouraging the use of combination washes and looking for something that will prove satisfactory. With the combination wash one gallon is mixed with so many barrels of water and consequently we know that the solution we are using will be of uniform strength throughout. No matter how careful we may be in mixing the lime, sulphur and salt, I do not believe that any five barrels would analyze exactly the same. The necessity for purity in spraying materials is nothing new but I wish to emphasize it.

Within a radius of three miles of where I lived there is a party who used the lime, sulphur and salt solution boiled. He has succeeded in exterminating the scale and in marketing a crop of fruit that was entirely free from it. Yet in the same neighborhood there are half a dozen men who use the same application and their crop is not marketable. I find that this condition exists in every State which I visit. I find that the identical wash is perfectly satisfactory with one man while it is a complete failure with another. The only way I can account for it is that, where failure has occurred, some detail of the work has been neglected somewhere along the line. It cannot be otherwise. Effective spraying will not admit of any guess-work or of careless methods. We have simply got to do it in the right way and do it thoroughly. It will not answer to drive along a row of fruit trees as fast as the horse walks and say that you have sprayed those trees. Unless you cover every part of the tree, much of your time is being wasted. This is not a new idea, but I want to impress the necessity for more thoroughness in our work.

No matter what make of pump a man uses, one thing is certain—you have got to have power: and manual effort will not furnish the right kind of power for effective spraying. Therefore, I always advocate the use of power sprayers wherever practicable.

In connection with pumps, there are a great many points that should be taken into consideration, and to many of them we pay but little attention. The nozzle, tubing, and valves have all to be considered. What is the use of a high pressure if we sacrifice that pressure before we get to the end of the nozzle? We must remember that we have to spray our trees and not sprinkle them. The only way to get a fine mist-like spray is to have sufficient power generated, in the first place, and then to see that the power is not dissipated before the spray leaves the nozzle. Therefore, it will be seen that every valve or tube or aperture which is too small for the amount of material that has to be carried through it, is lessening the force. I find that 1-8 inch brass tubing is being used in all the bamboo rods. With 100 to 120 pounds pressure you cannot carry sufficient material through 1-8 inch tubing to supply two or three nozzles. A tubing of aluminum has lately been introduced, which is 3-8 of an inch in size and is lighter and more durable than the brass. With this tubing an eight foot rod weighs 1½ pounds, while a similar rod with the brass tubing will weigh two pounds. The larger tubing will carry the material to the nozzle without any sacrifice of power. The chief point to be observed in this connection is to see that in your tubing, valves and joints there is no point of resistance until the hole is the nozzle is reached. Then you will have a spray that has surface covering power and capacity. The point in spraying is to cover as much surface with as fine a fog as possible. The fog strikes the underside of the leaf just as much as it does the upper side and every part is reached.

There are a number of good nozzles on the market. 'One of the chief points to be observed is that the nozzle does not offer resistance to the passage of the spraying material by a decrease in the size of the aperture or in any other way. One of the newer types is seen in the Buffalo nozzle. This is a straight type of nozzle, without any bends or turns and the bore is as large as the tube itself until the nozzle-cap is reached.

A MEMBER: A grower in my section used this lime and sulphur wash in the fall with bad results. He claims that the bud was not sufficiently protected at that time of the year.

MR. BROWN: It was probably due to the salt in the mixture. The fruit bud is more tender just when the foliage drops from the tree than at any other stage in its existence. For this reason care must be observed in fall spraying; but what are we to do when it is a question of remaining in the business.

Q. Are your vineyards seriously affected?

A. Not in my neighborhood. I saw for the first time in New Jersey last week a vine that had scale on it. As bad as the year has been on account of the excessive humidity which neutralized the results of spraying to some extent, yet I have a letter from the most prominent grape-grower in Delaware, who writes me that he sprayed his grapes from four to six times using Bordeaux mixture, spraying the first time when the new growth was ten inches long. As a result 99 per cent. of Moore's Early were absolutely perfect, as were 94 per cent. of his Concords and 92 per cent. of his Niagaras. His crop realized $6,500 at the vineyard. Many of his neighbors who have not been giving attention to their vineyards did not market a single package of grapes this fall. I have another letter from a gentleman in Pennsylvania who is located in a scale infested district and where the codling moth was particularly bad this year. He says "We finished picking our apples and they ran 97 per cent. perfect, and realized $2.15 per barrel in the orchard." Spraying not only makes perfect fruit, but it improves the quality of the fruit. When you have fruit that is as perfect as the above, you also have perfect foliage along with it, and the result is an apple of higher quality. To-day the consumer is asking for high-grade fruit, and the fruit grower must produce something that will supply this educated demand.

Professor SHUTT: I regret that Mr. Brown has been compelled to leave, as I should have liked some further light on one or two points. The point was raised as to the effect on foliage of the lime, sulphur, and salt wash, and it would be interesting to compare the effects of the self-boiled wash in this connection. The object of adding the salt is to raise the boiling point and thus bring about a more complete union of the sulphur with the lime. I do not see why the salt should be injurious to the foliage. I understand that there is a certain amount of caustic soda formed, but the main portion of the salt would remain as sodium chloride. We add caustic soda in large quantities to our self-boiled wash. The uncombined salt could not be injurious as it is a natural chemical compound and not caustic in its nature.

In regard to the mechanical emulsion,—flour and petroleum—we gave it a pretty fair trial and it makes a splendid emulsion, but does not last as long as one made with freshly slaked lime, and we cannot recommend it where it is important to carry over the emulsion.

There is another point which I do not understand, and that is why process lime will not make as good an emulsion as freshly slaked lime. I do not know what the Americans mean by process lime unless it is what is termed carbonated lime. The object is to finely divide the kerosene, no matter what substance may be used, and if the lime is fine enough I do not know why it should not be effective. Carbonated lime is more granular than freshly slaked lime. In regard to such products as Kiloscale and Scalecide, I regret that Mr. Brown gave us no indication of their constituents. If they are oil compounds, what is it that holds the kerosene in emulsion? I think it is important before advocating these proprietary compounds that we should know what we are using.

Mr. TWEDDLE: We tried the flour and kerosene emulsion on a small scale, but found it did not hold in suspension well, and was difficult to force through the nozzle.

Mr. SHUTT: We never had any trouble in regard to the nozzle. The emulsion is just like cream, and there are no lumps in it. It you put the kerosene on top of the flour and add water and churn for five minutes, there is no difficulty.

Mr. TWEDDLE: Mr. E. D. Smith experienced a similar difficulty. Another trouble we had was to know how to handle air-slaked lime and get it right. We did not know the quantities of water and lime to use.

Mr. SHUTT: The lime must be thoroughly burned, or it will be lumpy, and it should not contain much magnesia.

Mr. MACOUN: We found in our experiments that where the lime was a little damp when slaked it made a better emulsion, so that it is not necessary to have a dry powder as one might think.

REPORT OF COMMITTEE ON NEW FRUITS.

PRESENTED BY H. L. HUTT, PROFESSOR OF HORTICULTURE, O. A. C., GUELPH.

SEEDLING APPLES.

From Mr. Wm. Jarvis, West Gravenhurst, Ont.

No. 1. Seedling from Duchess of Oldenburg; medium to large (2½ x 2¾), roundish, smooth; yellow skin, lightly covered with pale red with scattered purplish streaks. Somewhat like Duchess in appearance and quality, but keeps for a month or two longer. No doubt valuable for the north.

No. 2. Medium size, roundish oblate, smooth and handsome: resembles Wealthy in shape and coloring. Fine grain and good quality. Matures in October and keeps till February. The most promising of the lot.

No. 3. Small to medium. White skin, well covered with light and dark red on exposed side; numerous dots. Flesh white, good quality. About the size and a little of the appearance of Snow. Matures about middle of September. Has long thick stem and long closed calyx.

No. 4. Medium size, roundish oblate; yellow skin well covered with broken stripes of light and dark red. Like a well colored Duchess. Calyx lobes very short and open. Small core. Fair quality. Season October. A handsome apple and promising for the north.

From Walter Cowan, Guelph.

Medium to large; roundish oblate, waxy light; yellow skin, lightly shaded on sunny side with lighter red. Stem short and thick in deep wide cavity; calyx very small and closed in small smooth basin. Showy apple, a little of the Colvert type, but handsomer and evidently a good keeper. Firm, and crisp, quality said to be excellent.

SEEDLING PEACHES.

Sept 29th. Received from Wm. McFarlane, 137 Catharine St. South, Hamilton, Ont.

A large yellow-fleshed, freestone of the Crawford type. Showy in appearance, of excellent quality; maturing about last week of September.

Oct. 21st. From W. M. Orr, Fruitland, Ont.

A large yellow-fleshed freestone of excellent quality, ripening second or third week in October. Promising because of its large size, good quality, and late season of ripening when most of the good peaches are past.

Mr. Orr says: "It is much superior in color, size, shape and flavor to any other late peach that I know of."

NEW FRUITS.

W. T. MACOUN, HORTICULTURIST, C.E.F., OTTAWA.

The annual presentation of the report of the New Fruits Committee cannot but help to suggest to the minds of this Association the question: Is this report of any value, and is anything being done to further test the promising varieties mentioned in this report, or is any work being done in Canada to originate new varieties suitable to the best fruit-producing districts? All these questions can, we think, be answered in the affirmative. This report is valuable because it places on record the names and descriptions of all the promising fruits which came before your Committee during the year. Should any of these varieties in future years find their places in the commercial nurseries of the country their history can be traced and their original description compared with that given by the nurseryman. This report not only serves as a record, but it brings these varieties and their qualities under the notice of all the members of the Association, so that anyone wishing to test the more promising ones can do so, providing scions can be obtained. In reply to the next question as to whether anything is being done to further test the promising varieties mentioned in this report, we may say that practically all the promising varieties of fruits which are personally examined, that are at all likely to prove hardy, are being tested at the Central Experimental Farm, and we think should be tested at the Ontario Fruit Experiment Stations. If a man sends in a seedling apple, for instance, and it is considered promising, scions are asked for and if received are propagated at Ottawa and later on the young trees are planted in the orchard. At present there are about 100 promising seedlings of apples alone being tested in this way. The results of such tests take time and it has always been the policy of the Horticulturist at Ottawa to thoroughly test a variety before recommending it for general planting. For this reason there have been comparatively few additional kinds added to the list of those recommended. When we are convinced, however, that a variety is a decided acquisition the planting of it is strongly encouraged. The McIntosh Red, North-Western Greening, and Milwaukee apples are varieties of comparatively recent introduction, the planting of which has been recommended in this way. The Ontario Fruit Experiment Stations have furnished much useful information as to the value of the newer named varieties in the various parts of the Province. A large number of seedling apples from seed of McIntosh, Fameuse, Swayzie Pomme Grise, Lawver, Northern Spy, Salome, Wealthy, and others are under test. Quite a number of these fruited this year for the first time. The majority of these were apples of good size and fair quality, but few are sufficiently promising for further test. There are nearly 2,000 of such seedlings to fruit yet. There are also a number of crosses, the parents of which are McIntosh, Lawver, Northern Spy, Milwaukee, and North-Western Greening, from which something good should be obtained. There are also seedling plums, currants, raspberries, strawberries and grapes out of which there are some which we are confident will find a place among commercial varieties. The work of Dr. Wm. Saunders in originating hardy apples for Manitoba and the North-West is well known to this Association.

There have been comparatively few new varieties come under our notice this year, but the following are those considered most promising:—

Seedling Crab: Marrison, R. A., Cataraqui, Ont. Fruit, large size for a crab, 2x2½ inches: form roundish, slightly angular: cavity, medium depth and width: stem long, slender: basin open, medium depth, much wrinkled: calyx closed: color yellow, well washed with deep crimson and splashed with dark crimson: dots few, yellow, distinct: skin moderately thick, moderately tough: flesh yellow, tender, juicy: core medium, flavor briskly subacid, pleasant, very little astringency: quality good for a crab: season probably early to mid October.

A handsome crab of the largest size. May prove desirable as a late variety.

Apple: Coughan, R. (M.D.), Hastings, Ont.

Fruit, medium size; form oblate to roundish; cavity deep, medium width, russeted; stem short, slender; basin medium depth and width, smooth; calyx probably open; color yellow, almost entirely covered with bright crimson; dots moderately numerous, yellow, distinct; skin moderately thick, tender; flesh white tinged with red, tender, juicy; core small; flavor briskly subacid. Little decided flavor; quality above medium; season probably mid September.

A seedling growing in remote part of farm near Hastings village. A very handsome apple of good shape with an aroma. May prove a useful apple at this season of the year.

Apple: Pratt, Wm., Penetanguishene, Ont. Seedling No. 2:

Fruit medium size; form roundish; cavity narrow, medium depth; stem, medium length, moderately stout; basin, medium depth and width, wrinkled; calyx partly open or closed: color yellow, well washed and splashed with rich crimson; dots numerous, yellow, distinct; skin moderately thick, moderately tough; flesh dull white, firm, juicy; core small; flavor subacid, pleasant, not high; quality above medium, almost good; season probably early winter. Tree supposed to be a seedling of Wealthy. Grows on an adjoining farm to that of Wm. Pratt. A handsome apple, worth testing.

Pear: Williams, J. S., Bloomfield, Ont.

Fruit: Size above medium; form, obovate, obtuse, pyriform; cavity, shallow, medium width; stem, stout, medium length; basin, medium depth, and width, smooth; calyx, open; color, yellowish green with a bronzy red blush on sunny side; dots obscure; skin moderately thick, tender; flesh, yellowish, tender, melting, slightly granular, juicy; core, medium; flavour, sweet, good; quality, very good; season, probably late October; tree, a cross of Belle Lucrative and Josephine, as hardy as the Jules, season, November. General Notes: A good deal like Belle Lucrative in flavor, promising.

The Americana plums are proving of such value over a large portion of the Provinces of Ontario and Quebec that we take this opportunity of referring to a few of the best of the newer introductions which have fruited at Ottawa, in the hope that at least some of them will soon be offered for sale by our nurserymen. Those considered the most promising are: Admiral Schley, Bomberger, Oren, Lottie and Smith, although there are other very good ones. These are described in the 1904 report of the Horticulturist, Central Experimental Farm.

We would also like to draw the attention of this Association again to the Herbert raspberry originated by Mr. R. B. Whyte, of Ottawa. This is decidedly the best red raspberry in the plantation at Ottawa, and has gained friends wherever it has fruited. It is now on the market.

ADDRESS.

By Hon. Sydney Fisher, Minister of Agriculture for Canada.

I do not come before you this afternoon with the idea of delivering a set address to this gathering. I was fortunate to arrive in time to hear a portion of Mr. Brown's remarks on the very important question of spraying. It is one which has attracted the attention of our fruit growers and even of our farmers for a number of years. It is a subject in which great progress has been made and will, I believe, continue to be made, not only in the practicable application of methods, but also in the discovery of agents for the destruction of insect and fungous growths, and in the various preparations used in spraying. I noted in those remarks one or two matters concerning which I should like to say a word or two. Mr. Brown spoke of the ravages of the San José Scale in the United States. We, in Canada, are to be congratulated that those ravages are very restricted here. It is true that in this Province there is a certain comparatively small section which is, I believe, somewhat affected. I am glad to say, however, that by reason of the law against the indiscriminate importation of nursery stock from those countries in which the scale exists, no new outbreak has occurred in Canada since that law was placed upon the Statute Book and enforced. I congratulate the people of Canada that the law has been effective in preventing the introduction of this enemy where it was not known before the existence of that law, I will go farther and congratulate the people of Canada on the fact that by reason of the provincial organization in this Province, the inspection, and the insistence on a proper fumigation of nursery stock, there has been no spread in the Dominion of that dreaded enemy through any parts of the country which were not affected before the matter was taken up by the Government. This shows that, so far as Government work is concerned in this country, it has been as effective as it could have been. It is true that in places where the scale previously existed it has not been stamped out; but the experience of other countries has been that where scale did exist, it has continued to spread and become worse and worse. We have been saved from this by Government intervention, first of all by the steps taken to arouse the public to the danger impending, and second, by the preventive measures that have been taken to prevent its spread.

I spoke about the Provincial organization in aid of the farmers and fruit growers, especially yours in the Province of Ontario. By our constitutional arrangement in Canada there are certain classes of subjects relegated to the Provincial authorities and other classes which are relegated to the Federal authorities. It is well that the people should understand this division, and that each authority should keep to its own work as much as possible; and where there may seem to be some overlapping, that the two authorities should work co-operatively so as not to interfere each with the other's work. Matters of trade and commerce are especially relegated to the Federal authorities, and more particularly is the Government at Ottawa and for this purpose my own Department entrusted with the matters of Trade and Commerce. Matters of teaching and education are especially relegated to the Provincial authorities, and it would not be well that the Government at Ottawa or any Department of it should enter into that field, either interfering with the work of the Provincial authorities or duplicating it, or overlapping it. So far as I am personally concerned, I have quite enough to do in the sphere of work, which is legitimately put into my hands so far as the agriculture of Canada is concerned, without being ambitious of having thrust on me or trying to grasp any work that does not properly belong to my Department. I am in that happy position of having more to do probably than I can do as effectively and well as I should like, and it is not my personal desire to take upon myself or upon my Department any work that I have not got to do. Therefore I think it is wise and right to leave purely educational work to the Provincial authorities all over the Dominion. I am well aware that our experimental work, and the issuing of information gained by those experiments, is to a certain extent educational. Still it is not what might be called local education or schooling in the strict sense of the term; it is the result of certain experimental investigations; and of course we have to give to the public the information acquired in conducting those investigations. When it comes to the question of dealing with what I may call purely local work such as the details of fruit growing, details of orchard management,—I am talking of these particular things because they are all especially interesting to you—these things are local in their character, vary very greatly in different parts of the country, and are more bound up with local education. Therefore it is better to leave them to the Provincial authorities who understand better the local conditions and circumstances. When it comes to the larger questions which apply equally to the whole Dominion, to those questions of inter-provincial trade and the management of it, still more to foreign trade and the management of it, it is proper and right that the Department of Agriculture at Ottawa should deal with these problems and that the local authorities should place upon our shoulders the responsibility in connection therewith. The work of the Department at Ottawa is more particularly directed in the fruit branches to those things which apply to the whole Dominion and are not, strictly speaking, of local use or of local educational effect. I want to give this explanation for two reasons, first, to let you understand what you may fairly call upon us to do, and second, what is the nature of the responsibility that we wish to throw upon the Provincial authorities.

In regard to what the Department at Ottawa has done and is doing, you are, I am aware, pretty familiar with it. My various experts have been going about the country and mingling intimately with you. I am proud to say that in the service of the Department at Ottawa, in matters which pertain to your branches of industry, as in many others, I have a most efficient and effective staff of officers, who are doing excellent work for the people of Canada. As we are dealing principally with commerce and trade and not with the details of local work, our work for the fruit growers is intimately allied with some other work which we have to do. In this connection I want to give some explanation regarding the choice of the official who has been placed in charge of the Fruit Branch. Some criticism was aroused a little while ago on account of the fact that when an independent Fruit Branch was established in connection with my Department, a practical fruit grower was not placed in charge. You are aware that Dr. Robertson left the Department a short time ago, and as a result there was some re-organization in which I had to divide more or less the work he had been at the head of, among certain other officers of the Department. I examined the different kinds of work done in his branch to see how they could best be arranged and classified. I found, as a matter of fact, that questions of transportation were intimately allied with cold storage transportation so far as our work was concerned, and that they were also allied with what we called under Prof. Robertson's administration, the Extension of Markets' Branch. These two particular branches deal with the transportation of all perishable products of our Canadian markets, such as butter, cheese, meats, fruits and vegetables, and not only with the transportation of these products but with the handling, packing, management abroad, and the supervision of the handling of these articles at our export ports and in England, our great market. The same men looked after the fruit as looked after butter and cheese, not because they were experts in fruit or in dairying, but because they were charged with looking after the handling and transportation of our perishable food products. I found as a result that the management and control of these important branches of the work of my Department must necessarily be kept together, if it was to be properly and effectively carried out, and that I could not divide it without detriment. For that reason, all this work was put under the charge of Mr. Ruddick, formerly assistant to the Dairy Branch, but who now has charge also of the Transportation Branch and the Extension of Markets' Branch. Otherwise, so far as any expert work or opinion in connection with fruit is concerned, just the same officers are in charge of the business as were in charge under Professor Robertson. There is no change so far as the work is concerned, and there is the same efficient co-operation and work being done for all these interests. It is not a question of persons or individuals at all, or of the largeness of the interests; it is a question of the administration of the work of the Department, not for the convenience of the officers, but for the efficiency of the work that this arrangement was found necessary. I am glad to know that, since the first discussion of the question arose, the work has been going on equally as successfully as before; and I believe that the first idea which prevailed among a number of the fruit growers of this Province has disappeared, and that they are now satisfied with the arrangement.

In regard to other matters that are under our jurisdiction, intimately allied with the question of transportation is the question of preparing the product for transportation and for the market. For a good while back one of the most serious difficulties that our Canadian fruit has had to contend with in the foreign market (also to a considerable extent in our home market) has been the complaint as to improper grading and packing. We have had the keenest competition from abroad. Why is it that California stands pre-eminent in her fruit business? Not only because she has been able to produce very large quantities at home, and because the character of her fruit is in a general way better adapted to carriage and transportation, but because,—and perhaps this is the most important reason of all,—of the organization of the fruit interests of that country by means of which growers have been able to select, grade, and pack their fruit in a way that suits the market better than our people have been able to do. It is for this reason that she has been able to keenly compete with our growers not only abroad, but in our own markets, and especially in the Western markets. In a general way her fruit is not as good as ours in quality; her peaches are far inferior; her pears may be as good; some of her plums are good, but not equal I think in quality to our own; her grapes are of a different character and suit some markets better than ours; but the great reason for her success is found in the organization of her interests, which has enabled her to put her fruit on the market in a more attractive shape than our own.

Why cannot the fruit growers of this country organize themselves co-operatively as they have done? Is it because we are less intelligent, or because we have local jealousies which prevent, or is it because each of us wants to get the better of his neighbor? I do not know what the reason is, but I find all through our whole social and commercial system the same difficulty in getting our people to work harmoniously and co-operatively together, a difficulty which does not seem to exist in some foreign countries. California has set us a great example in this respect. In Denmark we see the results of co-operation and mutual help, which threaten to endanger our position in the English market in regard to the bacon and dairy trade. There is something wrong amongst our people; something wrong, perhaps, with our social system, which prevents that co-operation and organization which these people seem to be able to carry out, and by so doing to meet us in the competitive markets, and to some extent in our own markets. I want to say to you fruit growers that you ought in your own interests and in the interests of your community to try to remove that difficulty, and form associations, or get together co-operatively, and do your work so that the whole district may reap the benefit of mutual help and confidence. One of the greatest stumbling blocks in the way of the marketing of your products is in the lack of that organization and co-operation. You may say that your interests are not so large; that California has been able to do this because of her enormous production; but I claim that, for this reason, it is all the more necessary that our people should work together. If one individual in a particular neighborhood cannot supply enough fruit to provide car load lots of fruits to fill certain orders, and to make an impression on the market. it is all the more necessary that a group of neighbours should join together to meet the demands of the market and make arrangements which will enable their fruit to be sent forward in large quantities in order to meet the competition of these other people.

We are ready and should be glad to give every assistance on our part so far as the imparting of information goes. We cannot undertake to mix up in commercial undertaking; that is contrary to the duty and spirit of departments of Government; but if it is useful that information in regard to these things should be gathered and placed at your command so that you may be able to do this, we shall be only too glad to get that information and place it at your command so that you may be able to act upon it and adapt it to your conditions. As an evidence of our desire, I will point to the fact that lately I brought from the West an expert packer, who has been giving demonstrations in fruit-packing in various parts of eastern Canada. Since that occurred, I have not had an opportunity of getting a report upon his work, but incidentally I have learned that he made some interesting exhibits of his work, which will, I have no doubt, be of some benefit. If more of that kind of thing is required, I shall be only too glad to carry it out.

I may say that I again visited British Columbia recently, and there found an evidence of improvement in selection and packing which is very gratifying. When I visited what are now the Provinces of Alberta and Saskatchewan four years ago,—which is the territory nearest to British Columbia,—I saw everywhere California fruit in command of the market. I found on this second trip that the British Columbia fruit had practically driven it out of the market, and the fact that it had done so was due almost entirely to the improvement that had taken place in selection, grading and packing. They are able to place their fruit before the consumer just as attractively as any of the Californian Associations, and the result is that the people of the country buy it in preference to the foreign fruit. If you want to get an entry into the Manitoba and Western markets (and I believe that, under existing conditions of transportation you have a little better chance in the Manitoba markets than the British Columbia growers, and might compete on even terms with them still farther West)—if you want to succeed there, it is necessary that you should put your fruit up as well or a little better than they do.

I am not going to say anything about the working of the Fruit Marks Act. That Act was introduced because of the almost universal complaint in regard to the packing of our fruit. I have the most gratifying testimony from abroad that the results have been extremely beneficial. We have been somewhat slow in putting it energetically into force; it was a new thing; it was pretty severe in its provisions, and therefore I instructed my officers not to be too hasty or too severe for the first year or two. I think the time has now come when the law may be fairly enforced in all its severity, and I think that in the interests of the fruit growers and of the honest, intelligent packers, as well as in the interest of the consumer, the provisions of the Act ought to be strictly enforced, and I trust that this will be the case another season. That the Act is good and that it is effective is proved from the fact that in no case, or at any rate, in very few cases, has there been a failure to convict whenever the machinery of the Act has been put in force.

We had a deputation of dealers in fruit come before the Tariff Commission yesterday. I asked them amongst other questions about the packing and grading of our fruit. They said at once that the results of the Fruit Marks Act had been most beneficial, but that apparently there were a number of packers who did not seem yet to have learned how to pack their fruit, as well as numerous producers and shippers. This indicated to me that our people still have something to learn. I do not believe that our growers and packers are dishonest or do not desire to live up to the provisions of the Act, but there is a great deal of carelessness, perhaps of ignorance and short-sightedness, among those who still neglect to grade and properly pack their fruit. I trust that the educational programme which has been going on in regard to this will continue, and that the fruit growers themselves will do their best to continue the improvement. I have spoken frankly and freely to you. I appreciate the opportunity of coming before you. I want to congratulate you on the progress that has been made in your work, and I am sure that this Association and the various local Associations have contributed largely to that improvement and progress; but I want to impress upon you that you still have much to do, and I invite and ask your co-operation and assistance in carrying out that work. If you can point out legitimate work which we can do in the interest of fruit growing, it will be my duty and pleasure to endeavor to carry out those suggestions.

REPORT OF COMMITTEE ON CO-OPERATIVE ASSOCIATIONS.

By A. E. Sherrington, Chairman, Walkerton.

Mr. Sherrington: I am a stronger believer to-day in co-operation than ever I was, owing to the success that has been achieved by the associations now operating. We have three or four such associations which have been in active operation for the last two or three years or longer. This season we organized several others, and they are making a perfect success in the shipment of apples. Among the active associations, I may mention the ones at Forest, Chatham and Oakville. The latter was organized last spring in the form of a joint stock company, and it is handling all the apples in that district except those of one man, who, I believe, broke away. One of the difficulties we have to contend with in connection with this movement is that members are sometimes led away by a buyer who will offer them a few cents more per barrel for their fruit. We want more men like the President and Manager of the Forest Association, who was offered 25 cents over and above the amount which the Association was offering to its members, but who declined the offer, stating that his apples must go through the hands of the Association. As soon as these men find that we are determined to stand together this temptation will no longer be presented to us.

Q. Do you think that it is done with the deliberate intention of breaking up the organization?

Mr. Sherrington: I do not claim that this was so in my own case, but I have known of such instances occurring.

Clarksburg has organized a splendid association, and I understand that they have erected a storage building which is superior to anything of its kind in the Province. Other associations exist at St. Catharines, Burlington, and Burford. A number of others were organized, but, having no fruit this year in their locality, they did not do any business. This is also true to a large extent of the Associations at Owen Sound, Thedford, Parkhill and Ilderton. Our Association at Walkerton is still in good standing, but, as we had no fruit this year, we could do no business.

In connection with this work I think the time has come when an effort should be made to have representatives from these Associations attend the meetings of this convention without too much cost to themselves. I think that the movement is of the greatest importance to the fruit industry, and should receive a full recognition from this Association. I think the time has arrived when we should promote the work of organization more vigorously than ever, and, through these societies, get into closer touch with the wholesale and retail merchants in Great Britain.

A MEMBER: They should send their agents here and purchase f.o.b.

MR. SHERRINGTON: They are doing so, and I explained to them, when over there this summer, that they could make more money by this method if they would provide storage over there for our apples.

After visiting all of the principal fruit markets in England and Scotland, I am more convinced than ever that co-operation among the growers and shippers of Canada and other countries is an absolute necessity if the growers are to retain that market and receive a share of the profits on the products of the orchard. I saw some dickering in Great Britain last summer that could scarcely be called square dealing, in fact, it was anything but square. Who was the loser in this particular transaction? No one but the shipper. The commission merchant had his commission and was at no loss. The time is coming when our fruit and other produce will be sold f.o.b. here, instead of by consignment.

Retail merchants I saw expressed themselves as very much pleased with our method of co-operation in packing apples, and agreed that all products should be sold direct, and not handled on commission.

I interviewed several retail fruiters in regard to shipping apples in boxes. A number of them had had no experience with boxes, but said they were willing to give them a trial, believing that they would be very convenient for their trade. Others who had handled apples in boxes were perfectly satisfied that it is the right package for the finer sorts.

During the short time that I was in Europe I had no difficulty in arranging with reliable parties to take all their requirements from our cooperative association f.o.b. here. If the right kind of man was over there one season he would be able to place nearly all the apples grown in Ontario by straight sales to reliable parties. It does not pay to send anything to Europe but first-class goods. When good fruit was offered the buyers vied with each other in bidding, but when the goods were inferior bidding was slow.

It is a great mistake to mark the barrels wrongly. I saw some apples on Covent Garden Market, London, put up at Colborne, Ont., marked XXX Duchess. I opened some of the barrels and found one marked XXX Duchess which had not a Duchess in the barrel. They were green apples without a particle of color. Another barrel contained Duchess, but only number two, and marked XXX. This kind of packing will not do. It can be prevented by co-operating in packing.

The need for greater co-operation on the part of Canadian growers becomes more apparent every year. Co-operation will mean better packing and higher prices, and will strengthen the fruit industry in all its branches. Wherever it has been given an honest trial in Ontario it has been a great success. The more of these associations we can have, the better for the growers of the province.

MR. RICKARD: Does your Association pick the apples, or is the work done by the grower?

MR. SHERRINGTON: The grower picks the fruit and brings it in.

MR. RICKARD: We cannot get that done in our section.

MR. SHERRINGTON: I do not understand why the buyer can get men to pick fruit while the grower cannot.

MR. LICK: Why could not the co-operative association supply the labor? They could employ a gang of men and keep them regularly at work through the picking season, sending them from orchard to orchard. This, it appears to me, would be the most satisfactory and economical method.

Mr. Rickard: With us the buyer always picks the apples. He brings his men from a distance, as a rule, at any rate all the expert pickers. They get fifteen dollars a week, and their expenses at the hotel. This, of course, comes out of the pocket of the grower indirectly.

Mr. Sherrington: It is clear that the work of education will have to go on.

Mr. A. W. Peart, Burlington: We have several co-operative associations in my district. The one to which I belong has been in existence for twenty years, and comprises ten or twelve members. Every year we appoint a manager on salary. We hold a meeting at the beginning of the season, and adopt rules and regulations as to packing, to which each member subscribes. Each member has his name and address painted on his packages, and, in addition, we have a common brand. In this way his individuality is maintained. Our business is a box business entirely. We prefer boxes because we find that 99 per cent. of them reach the Old Country market in first-class condition, and we are not troubled with slacks or wets or anything of that kind, and, therefore, we obtain a better average price. I have accounts for two or three shipments made since Sept. 20. The first lot netted our shippers at the rate of $2.00 a barrel, after paying for picking, packing and transportation. This was the average for the lot, consisting partly of No. 1 and partly of No. 2 fruit. From another shipment, of which I received the returns a day or two ago, we averaged for our fruit 6d. per box more than the current market price.

D. Johnston, Forest, President of the Forest Co-operative Association: Our association has had a very successful season this year. In former years a great deal of our business was with the west, but this year we sold the crop to an English firm, which paid $2.50 for No. 1, and $2.00 for No. 2 f.o.b. Forest. The firm paid us spot cash, and we got along very nicely, indeed. In the spring it was decided that all members must spray their trees at least four times during the season, twice before blooming and twice after. Our experience of last season made it clear to us we must grow fruit successfully before we could co-operate successfully in selling it. We found that some of our members did not spray, or look after their orchards, and took no interest in them, nor in the success of the Association. This year we enacted a by-law compelling every man to spray his trees. The result was that members of the Association this year had a good crop of apples, while those men outside of the Association, who did not spray, had almost a failure. At present each member sprays his own trees, but I think that it will end in the work being done by co-operative methods before very long. So far as my own experience in spraying goes, I may say that we had become almost discouraged in fruit growing until we commenced spraying our orchards. In two or three years we increased our output by this means from 300 or 400 barrels of inferior fruit to 1,500 to 2,000 barrels, the greater part of which was first-class. This result has now been maintained for ten years without a single break.

Q. What would be the best method of co-operative spraying?

Mr. Johnson: The ideal system would be to have a power sprayer go from place to place. Personally, I have not had much experience with power sprayers. We use a hand pump, and get along very well. Last year we spent fourteen weeks in spraying our orchards, and this season the work occupied twelve weeks.

W. D. A. Ross, representing the Chatham Association: Our Association was organized nine years ago with a small beginning, and the membership has now grown to seventy-five. We had a central packing house for four years. Before that, we had considerable trouble, and thought we should have to discontinue business. The Association has a power spraying outfit which has operated for two seasons. Although not compelled to do so by by-law, nearly all the members take advantage of it. The directors raise enough money early in the season to pay for the work, and each man's share is charged up to him, and deducted from the returns for his fruit. Spraying has easily doubled the value of the fruit. One man in our district has an orchard of 180 trees just coming into bearing. When we sent out our spraying circular in the spring, he thought that his crop was not worth attending to, estimating it at about fifty barrels. He finally decided to spray. A little later in the season he thought he might have a hundred barrels. He finally delivered 290 barrels of good apples.

Our method of handling the fruit is as follows: When a man brings his apples to the packing house we have a rubber stamp with his name on it, which is stamped on each case before it is packed, and his fruit is kept track of in that way. The culls are sent to the evaporator. We have a salesman of our own in the West, where most of our fruit is sent. This year, however, we sent some to Glasgow. The first shipment will net our growers about $2.00, and the second about $1.50. Some of the fancy lots brought as high as $3.75 per barrel.

PARIS GREEN AND ARSENICAL POISONS.

By Robt. Harcourt, Professor of Chemistry, Ontario Agricultural College, Guelph.

The absolute necessity of having some means of successfully combating the ravages of the potato beetle was responsible for the general introduction of Paris Green as an insecticide. When and by whom it was first used for this purpose does not appear to be known, but the use of Paris Green as a standard insecticide undoubtedly began in the Western States some time between 1860 and 1865. The fact that this substance was a poison, and that it injured the foliage, prevented its general acceptance at once, but these objections were soon overcome by the imperative demand for some means of destroying the beetle in order that potatoes might be successfully grown.

The success attending the use of Paris Green in destroying the potato beetle soon suggested its application to plants suffering from the attack of similar insects. In 1872 Riley suggested the treatment of cotton plants with Paris Green for the destruction of the Cotton Worm. The same year Le Baron, then State Entomologist of Illinois, advised the use of Paris Green in combating the canker worm of the apple. It was, however, some years later before the fruit growers in the Eastern States began to use this now well-known insecticide, and it was not until the early eighties that it was freely used by the orchardists in Ontario. As the composition and peculiarities of Paris Green became better understood, and the life history of insects and their manner of feeding has been studied out, the use of Paris Green and other arsenical poisons has become general, until at the present time hundreds of tons of these poisons are used annually in destroying the little but numerous enemies of the crops of the farm and garden.

Paris Green is composed of copper oxide, acetic acid, and arsenious oxide, combined as copper-aceto-arsenite in the following proportions:

Copper oxide	31.29 per cent.
Arsenious oxide	58.65 " "
Acetic acid	10.06 " "

Paris Green is not a chemically pure substance, and, as found on the market, rarely, if ever, consists entirely of pure copper-aceto-arsenite, but contains this compound as its chief constituent with varying quantities of other substances. The varying composition of Paris Green is usually due to variations in the care given to the details of the process of manufacture, the purity of the compounds from which it is made, and to whether or not foreign "make weight" substances have been added.

Among the small amount of impurities always present, sand, sodium sulphate, and uncombined arsenious acid are the most common. Barium sulphate, road dust, and calcium carbonate are sometimes used as adulterants. Fortunately, the presence of these substances is easily recognized by their insolubility in ammonia water. Paris Green itself completely dissolves in this liquid, giving an intensely blue-colored solution. This test, however, is not conclusive, since arsenious oxide is soluble in ammonia, and would escape detection if this method alone was depended upon. While total solubility in ammonia is scarcely to be looked for in a commercial article like Paris Green, the presence of any appreciable quantity affords valid grounds for rejecting a sample. According to the results of an examination of the genuineness of Paris Green sold in the Dominion in 1902 and 1903, reported in Bulletin No. 88, Inland Revenue Department, Ottawa, only 7 out of 169 samples examined were adulterated. From the figures given in this publication it would seem that an improvement has been taking place during the last ten years in the quality of Paris Green sold in the Dominion. The percentages of pure samples in previous collections were as follows:

1894	72.2 per cent. genuine.
1895	89.1 " " "
1902-3	95.8 " " "

Work in our own laboratory on samples collected directly from the country stores indicated a larger percentage of adulterated samples than the figures quoted above.

It is, however, to the presence of soluble arsenious oxide, to which the scorching properties of this insecticide is due, that the most attention is being paid at present. Several of the American States have passed laws limiting the amount of soluble arsenious acid in Paris Green. In California four per cent. is allowed; while New York's laws only permit 3.5 per cent. That there is a wide variation in the amount of water-soluble arsenious oxide is evident by the fact that in 22 samples examined at the Geneva Experiment Station, New York State, in 1900, the percentage amount of soluble arsenious oxide varied from .61 to 15.69, and averaged 1.68.

According to J. K. Haywood (Bulletin No. 82, Bureau of Chemistry, Washington), there may be three conditions of Paris Green which will cause a scorching of the foliage.

1. There may be a certain amount of arsenious oxide in the Paris Green over and above the amount combined with the other constituents.

This is "free" arsenious oxide, and, until recently, it has been considered the only cause of the scorching of the foliage by Paris Green.

2. The Paris Green may be poorly made, so that the constituents are very loosely held together. When such Paris Greens are put into water, especially water containing carbon dioxide, they are soon broken up, and arsenious oxide is set free. Even the best Paris Green breaks up under such conditions, but those poorly made break up much more rapidly. The effects of these substances upon the foliage would be somewhat as follows: First, the water of the spray would act at once on the Paris Green, and set arsenious oxide free, then carbon dioxide would dissolve in the water and carry the decomposition still further. But the breaking up would not end here, for the rain and dew, both containing carbon dioxide, would also act upon the Paris Green, and enough arsenious oxide would soon collect to seriously scorch the foliage. This would, of course, take place to some extent with the best samples of Paris Green, but, unless the climatic conditions were very adverse, not enough free arsenious oxide would accumulate at any one time to cause serious damage.

3. The Paris Green may be extremely fine. It is well known that even the best brands, when ground to a very fine powder and applied to the foliage, may scorch. This is, doubtless, due to the fact that more surface is exposed to the action of the water, which may contain carbon dioxide, so that its decomposing action on the Paris Green is accelerated, and enough free arsenious oxide soon gathers to cause serious damage.

It is a very common occurrence for Paris Green to scorch the leaf owing to one of the first two causes, i.e., either by reason of the presence of free arsenious oxide, or, because it is poorly manufactured; but it is very seldom that a commercial sample of Paris Green will burn, because it is in too fine a condition.

As is well known, the object in adding lime to Paris Green, before spraying, is to neutralize this free arsenious acid, or that formed by the decomposition of the Green in the water.

The best Paris Green is a powder composed of crystalline globules of microscopic fineness. Unless the particles are fine enough to pass through a 100-mesh sieve, the Green should be condemned as unfit for spraying purposes; for, if the particles are larger, there is no chance for an even distribution of the poison. The aggregation of globules is probably due to careless grinding and bolting, or, possibly, due to the after treatment to remove impurities. In drying from this operation, the globules cohere and form strings and bunches of particles which are sometimes found also to be bound together by crystals of uncombined white arsenic.

During the last summer six samples were sent to us for analysis. These samples were all of good quality, for they were not adulterated, and contained only small amounts of soluble arsenic.

According to experiments conducted with Paris Green of known composition, the various kinds of fruit trees show great differences in their ability to resist the burning or scorching action of the arsenious acid from the Paris Green. The apple tree is, apparently, the most resistent, and the peach the least. It is, however, equally true that the same trees are not always equally proof against the burning action of Paris Green. Weather conditions have a very marked influence. If, after the spraying there comes a long, dry period during which the dew and carbon dioxide of the air have been acting on the Paris Green, the first heavy rain is likely to be followed by a burning of the foliage. This is due to the water taking into solution the arsenious oxide which has been accumulated during the dry weather. If, however, there is plenty of lime on the leaf, the acid will be neutralized as fast as formed, and the scorching will be prevented.

It is, therefore, evident that Paris Green varies in composition, and in the readiness with which it is decomposed, that fruit trees vary in their ability to resist the acid found and formed in Paris Green, and that weather conditions may cause a very marked difference in the amount of arsenious oxide which may come into solution.

From time to time, during the last fifteen years, experimenters have claimed that Paris Green has considerable value as a fungicide. This claim is again advanced in Bulletin No. 267, Geneva Experiment Station, New York, where it is claimed that the Paris Green materially checked the potato blight, and, thereby, increased the yield at the rate of 46 bushels per acre. The figures quoted in this bulletin would give Paris Green a fungicidal value equal to about one-third that of Bordeaux mixture.

Regarding the character and value of some of the latest commercial substitutes for Paris Green, it may be stated that many of them depend upon Paris Green for their poison, and that some of them contain very little of this or any other poison. One brand recently examined in our laboratory was found to contain only about half of one per cent. of arsenious oxide, and others contained arsenious oxide and copper equivalent to from one to five per cent. of Paris Green. Gypsum, lime, sand and charcoal are prominent constituents of these mixtures. Laurel Green, and the various Arsenoids contain more arsenious oxide than the class just mentioned. But, while these substances may be bought for less money and may be held in suspension somewhat better than Paris Green, many of them contain an unsafe amount of soluble arsenious oxide, and are thus liable to do much harm to the foliage. The Pink Arsenoid, or lead arsenite, should, possibly, not be included in this latter statement, as some experimental work goes to show that it contains only a small amount of uncombined arsenious acid, and that it is no more dangerous to foliage than Paris Green.

Regarding home-made arsenicals, there seems to be no good reason why these may not be used in all places in spraying where arsenicals are employed. They are cheap, easily made, and answer well in spraying, as they are not hard to keep in suspension. Further, the lead arsenite and arsenate are among the most insoluble of all combinations of arsenic and metals, and are, therefore, not liable to burn the foliage.

The formula for making one pound of lead arsenate, i.e., enough for from 100 to 150 gallons of water, is to dissolve 24 ounces of acetate of lead (sugar of lead) in one gallon of water; also, separately, 10 ounces of arsenate of soda in three quarts of water; both in wooden pails. The separate solutions may then be poured together into the spray tank filled with water. A white precipitate of lead arsenate immediately forms, and will remain in suspension for hours. The preparations may be made several times stronger without the least danger of producing any injury to foliage.

Both the "Arsenic and Lime" and the "Arsenic, Soda and Lime" preparations are now used. In both preparations the arsenic is held as insoluble calcium arsenite. The essential difference in the two methods is that in the former the lime and arsenic are boiled together until combination takes place, while, in the latter, the white arsenic is first dissolved in sodium carbonate, so that when lime is added, combination takes place at once. As arsenite of soda will burn and destroy foliage, it should never be used without adding lime. Recently Lime Bordeaux has been used with arsenite of soda with good results.

In conclusion, it may be pointed out that mixtures of Paris Green, or home-made arsenicals, with either lime or soda Bordeaux, should not be made until it is ascertained that no harmful re-solution of the various ingredients is brought about thereby.

THE CANADIAN TARIFF ON FRUITS.

By W. L. Smith, "Weekly Sun," Toronto.

The subject that I am to speak upon this evening is one regarding which I have very strong convictions, convictions which have been based on a somewhat careful study of the facts and on the very best judgment that I have been able to bring to bear. I wish, first, to make a strong appeal to the members of this Association not to divorce themselves as fruit growers from the general farmers of the Province. I do not think you can afford to take a different stand on tariff matters to that taken by your fellow farmers engaged in general mixed farming. One thing it seems to me has been made perfectly clear, which is, that, so far as general farming is concerned, the tariff is of no benefit as a means of protection. Facts brought before the Tariff Commission prove that you cannot increase the selling price of the products of the farm by any tariff you may impose, for the reason that in the foreign market the price is governed by supply and demand, while in the home market we do not need protection for the reason that American prices are higher in all instances save that of hogs.

On the other hand, while the farmer cannot be benefited by tariff protection, he can be and is heavily burdened by the tariff on everything he has to buy. A convincing argument was presented by Mr. E. C. Drury, of Crown Hill, before the Tariff Commission recently, proving this to be a fact. He took his figures not at haphazard but from the actual expense account of his brother-in-law who is living on a 208 acre-farm, and showed that his expenses were increased annually by $180 because of the tariff on the articles purchased. The situation in which the general farmer finds himself therefore is that, while the tariff cannot increase the value of his products, it results in largely increasing the cost of everything he has to buy. I therefore appeal to you as fruit growers not to take a stand on this question which will place you in opposition to the general farming interests. If you ask for protection on your particular class of products, the manufacturer will certainly use it as an argument in favor of further protection for the articles he manufactures, with the result that he will take a still heavier toll from the general farmer. But even so far as fruit growing is concerned, I do not think you have anything to gain by increased protection. It does not appear to me that Californian fruits, for instance, compete in this market with our own products to any great extent. I do not think that any one would go so far as to shut out fruits which we either cannot produce, or which come upon the market earlier in the season than our own. I claim that there is no real competition between the Canadian and American producers of fruit in this market. During the past season, for instance, similar fruits were selling higher in the American market than they were here with the exception of pears, and so far as they are concerned, the facts are that we had a comparatively small crop while they had a very large one. This might have been offset by the exportation of peaches to the United States if our growers had been alive to the facts as they had a short crop while we had an abundant one. Unfortuately the opportunity was overlooked. It is true that tender fruits come in from the South in considerable volume in the spring, but they come in at a time when you have none to offer, so that they do not compete. Just as soon as our own fruit is ripe, the American fruit disappears from the market because of the superior quality of the home grown article. The American fruit must be picked long before it is mature because of the long distance it has to be transported, and it cannot be placed upon the market in as good condition as our own freshly picked fruits. I contend therefore that the tariff will not increase the price of your fruit, but just as in the case of your brother farmers, it does materially increase the price of what you have to buy. Everything that comes into your household must be dearer by reason of the tariff but the fruit farmer is subjected to special burdens in this connection. One of the biggest items of expense in connection with fruit growing is for baskets in which to ship the fruit. Baskets brought into this country are taxed 30 per cent. on their value. There was a case less than three summers ago when elm timber was taken from this Province to the United States and manufactured into baskets which were brought back here and sold in the face of the duty. During the past season one of the Niagara growers paid $300 more for his baskets than he would have paid if there had been no tariff on this article. Mr. Hilborn, one of your members tells me that he had occasion to purchase a certain make of wagon on the other side, which he could not buy in Ontario. The duty on such articles is twenty-five per cent., but in this instance the tariff does not show on the face of it the full tax imposed because, although he paid only $30 for the wagon, it was valued by the custom authorities at $40 and the tax on it amounted to $10, the ruling being that a general valuation of $40 was to be placed on all vehicles imported, no matter what their value.

Perhaps the most serious tax so far as fruit growing is concerned is the one on sugar. There is a very intimate relation between practical fruit growing and the price of sugar in this country. First because the price of sugar largely determines the quantity of fruit the Canadian housewife puts up for winter use and second, because it has an important bearing on the business of commercial fruit canning. One of our largest canners told me recently that one good crop of tender fruit from this Province would be sufficient to supply the whole of Canada with canned fruits for a period of two complete years. It is necessary that this surplus crop should be disposed of in some way before the next season's crop comes upon the market. If it cannot be consumed by the home market, it must be disposed of in the foreign market. The tariff on sugar directly affects the cost of producing canned fruits, and it is here that the situation is fraught with considerable danger to the grower. It is clearly essential for the welfare of the fruit industry that the export trade in canned fruits should be built up. The value of our exports of canned fruits ought to be equal to the value of our exports of fresh fruits. One of the greatest difficulties in the way of building up this business is the excessive cost of sugar. I am told by canners that the cost of sugar represents one-third of the selling price of canned goods. A tax of 46 per cent. on refined sugar coming into this country is a very serious handicap to this business. When this matter was brought to the attention of the Tariff Commission, it was suggested that a rebate might be arranged on sugar used in the canning of fruits for the export trade. But aside from the impracticability of such a scheme, it would certainly work a great injustice to the Canadian consumer.

It should be pointed out that when the statement was made that one full crop would supply the market with canned fruits for two years, it was on the assumption that the rate of consumption remained stationary. There is no reason why this should be the case. There is no reason why we should not consume double the amount we are doing, and the way that this might be brought about is to reduce the price of the sugar that enters into the article manufactured for home consumption, thus reducing the market price of that article. I remember that, some years ago, after the price of sugar had been very high, it was suddenly reduced by one-half. I was living in Toronto at the time, and I know that practically every person of my acquaintance put up double the amount of canned fruit that season that they had done formerly. The inference is obvious that if the cost of sugar is still further reduced, the consumption of fruit will be increased enormously.

Sugar should be cheap for the reason that it can be produced so cheaply in cane-growing countries. I obtained the official report in regard to sugar statistics from Washington. In that report it was shown that with raw sugar at 1½ cents per pound, there would still be left a fair profit to the Cuban sugar planter. The statement was made in Montreal before the Tariff Commission that American refiners charged a difference of about ¾ of a cent per pound between the raw and the refined article, that is to say, they charged ¾ of a cent for refining. If therefore the raw sugar can be purchased at a cent and a half it could be put on the market at a little over 2½ cents and sold retail at 3 cents, which is what we should have. With sugar at that price you would double the consumption of fruit in this country. In my judgment, and in that of many practical farmers, the establishment of the beet sugar industry in this Province was one of the greatest mistakes that could have been made. It cannot thrive, except it be protected by high tariff or is very heavily bonused. I am told by men in the business that beet sugar cannot be produced profitably unless it can be sold wholesale at 4 cents per pound but cane sugar can be sold at 3 cents a pound retail. Think what this difference means to the Canadian consumer. The policy of the fruit growers, it appears to me, should not be to ask for more protection on their finished products, but to ask for cheaper sugar so as to increase consumption with a corresponding increase in their output. Cheap sugar should be their watchword. With cheap sugar the fruit growing and canning industries would be two of the largest labor-employing industries in the country. I know of nothing that would do more for unskilled labor.

My conclusions briefly stated, are these: I do not think it is possible for you to increase by any tariff the selling price of your fruit; that the present tariff is a very heavy burden on the farmers and a still heavier burden on the fruit growers, and I urge you to stand by your brother farmers in demanding a lower tariff on the goods you have to purchose. No Government can stand against your united request.

Mr. Rice, Michigan: The tariff on sugar is one of the greatest curses we have in the United States. The Havemeyer Company has become so strong in our country that they very largely control the Government. The protection offered the sugar, steel, and other combines is one of the greatest curses we have. I belong to the Republican party, but I maintain that we have made some awful mistakes in this connection. As to beet sugar, there is not a women in my neighborhood who will use it in putting up fruit. You cannot protect an industry in that way without making the men at the head of it rich, and at the same time mean. They get the notion of living off the people and cannot do otherwise. Just as soon as they see the chance to put their hands into the people's pocket, they will do it.

Mr. H. W. Dawson, Commission Merchant, Toronto; There seems to be an impression that a greater quantity of fruit and vegetables was imported from the United States than was actually the case. Our exports to the United States were a hundred per cent. greater than our imports. Last year Toronto imported 420 barrels of apples. There were twenty men in Toronto who each exported more than that to the United States in one week. A high tariff against strawberries would be a mistake. The importation of early strawberries starts consumption going and broadens the market for the native fruit when it comes in. During the last two or three years the price of berries has been good on the average and they were a paying commodity. The same arguments apply to other fruits. The trade returns show that during the months our peaches were on the market the importation of American peaches was not heavy, the heaviest importation being in July, August and September; during October hardly any, and none at all in November. The total importation to Toronto last year was $11,000 worth, which was not much of a factor in a city of its size, as the consumption would average more than that per week in the season. Montreal imports more Californian fruit than Toronto, but that city is the distributing point for the east. I also maintain that an agitation for reduced freight and reduced express rates would do more for the industry than an increased tariff, as it would result in widening the market. What is required is a specified duty wherever possible, as great opportunities exist in the fruit and vegetable industry to understate valuation in making customs entries. The cost of the vegetables placed on the cars is frequently sworn to as being the value of the goods.

Mr. J. L. Hilborn pointed out that the manufacturer had an increased tariff already, and for the fruit and vegetable growers to ask for more protection was no reason why the manufacturer should do the same. He had been obliged to buy certain implements and appliances in the United States and pay the duty, but when he came to sell his products in order to pay for these goods, he found that the market was crowded with cheap American stuff which had paid very little duty. As to peaches if there were no protective duty, American peaches, under the conditions of transportation referred to by Mr. Dawson, could be laid down here far cheaper than our own. Cucumbers from the South were placed upon our markets in large quantities. When they arrived they were yellow and wilted and in many cases unfit for food, but they were so cheap that many people bought them instead of the superior article supplied by local growers.

Mr. Armstrong stated that he wished to take issue with one of the statements made by Mr. Smith, namely, that as soon as the Canadian product reached the market, importation from the United States ceased. On the 4th of August two carloads of tomatoes which had been consigned to Buffalo, but met with a glut in the market, were dumped into Toronto and auctioned off at 25 to 40 cents a bushel. The local growers were receiving from 40 to 50 cents per bushel at the time. Immediately after this occurrence tomatoes dropped to 25 cents and never went above it. He had personally investigated conditions in Montreal on two occasions and found that at the time of his visit, which was early in October, the Californian peach was practically the only peach upon that market, and it was much the same with some other fruits. In reply to his enquiry as to why Canadian peaches and grapes were not to be found there, he was informed that Californian fruit stood up better and looked better. Its quality was a secondary consideration. He was willing to allow the Canadian consumer to get all the American fruit and vegetables he required free of duty up to a certain date provided that when our own fruit came in, the American product was entirely shut out of the market and the market left for Canadians.

Mr. Dawson said he remembered the day the second car of tomatoes arrived from the United States. It was a Monday morning. On the following Tuesday the local shipments were ten times greater than on any day up to that time, but the growers received from 40 to 60 cents for them, whereas the American fruit realized from 25 to 50 cents. A good home grown article, he contended, would always command a good price. Foreign fruit that had been for eight to ten days in a refrigerator car could not compete with it.

A representative of the vegetable growers stated that their desire for a high tariff was in order to shut out inferior products. A higher tariff would mean that only superior vegetables would be shipped to this market. There was no objection to the importation of American vegetables so long as they came in ahead of the home product. But there were men in Ontario who were able to produce vegetables all the year round which were nearly as cheap and of better quality.

Mr. Dawson said that peaches could be bought in Michigan and laid down here, and the duty and freight combined was less than the freight alone from any of the peach growing districts in Ontario.

Mr. W. H. Bunting thought there was a strain of selfishness in human nature, and he did not claim that fruit growers were exempt from it. He had listened to Mr. Smith's able address, and assumed that this was simply a discussion of the principles underlying the question. As fruit growers they found themselves between the upper and the nether millstones as regards the tariff. When they had a surplus to send to the United States, they found themselves practically prohibited from that market. If they had anything to buy in the way of implements, packages, and appliances, the Canadian duty had to be faced. He did not wish to raise the sympathetic cry on behalf of the fruit growers, but, nevertheless, it was nothing but the truth to say that they were still further handicapped by climatic conditions, the season in this country being so much shorter than in the country to the south. One of these obstacles might be endured, but a threefold handicap made it necessary to rise in self-defence. He did not think, however, that the representatives of the fruit interests were ready to go before the Tariff Commission and ask, like the manufacturers, for a large increase in the tariff. His personal view was that the large majority were willing to allow matters to remain almost as they were for the present, but at the same time they were prepared to protest very vigorously against increased protection for the manufacturer.

Mr. Dawson had made the statement that there are more apples shipped to the other side of the line during one week than are imported in the entire year. Granting that the statement is correct, let us suppose for the sake of argument that 100,000 barrels of apples were sent to the other side from our orchards during the present season. There is a duty of 69 cents per barrel on that product. Who, I ask, pays that duty? The American consumer or the Canadian producer? If I am any judge of the matter, I believe the Canadian producer pays it. If Mr. Dawson exports apples to the United States, he does so because he knows that the market, say at New York, is at a stated figure, and he must make his purchase here at 69 cents a barrel less than would be the case if free traffic to the other side existed, consequently the producer pays the duty.

Mr. Dawson: They pay me the same price f.o.b. here as what we get shipping to Great Britain.

Mr. Bunting: These people would pay 69 cents a barrel more for that fruit if they had not to allow for the duty.

Mr. Tweddle suggested that highly protected industries were able to pay labor such a high rate of wage that the farmer, not being able to pay as much, could not secure the assistance he required.

Mr. Smith, replying to Mr. Armstrong, stated that the total amount of plums and peaches combined that came into this country last year amounted to only $107,000 worth. Our exports of berries alone amounted to $120,000 worth. As to tomatoes, $103,000 worth were imported, while the potatoes exported to the United States were valued at seven times that amount. He considered, therefore, that there were two sides to the question. As to Mr. Hilborn's contention that a higher tariff on fruit would have no effect on the manufacturer, he stated that the manufacturers had been trying for years to get the farmers to ask for more protection so that they might use this argument as a lever. The demand for more protection on the part of the horticultural interests would alienate the sympathy of the general farming community and prevent co-operation.

Mr. Bunting stated that he had observed by the day's newspapers that the retail merchants of Toronto had appeared before the Commission asking for a very marked reduction of the tariff on fruit coming into Canada, and he thought it incumbent on the Association to take some action in the matter. The majority of the fruit growers were, he believed, satisfied with the present duty. What they did object to was that some products were allowed to enter at a nominal valuation on the *ad valorem* basis and thus escape practically any duty. "A consignment of pears came to my own town from Delaware a week or two ago. They were entered at a nominal valuation for custom purposes, and came directly into competition with the crop in our own section. This is a case where the duty is ineffective, and I think the growers would like a specific duty substituted for the *ad valorem* duty."

Mr. Armstrong suggested that the only way to relieve the situation was to prevent the dumping of fruit on the Canadian market. He doubted whether a specific duty would meet the case. This was a matter that had irritated the growers during the past season more than anything else he knew of.

Mr. Bunting then moved "That the Fruit Growers' Association of Ontario in convention assembled would respectfully urge on the Tariff Commission that it would be disastrous to the fruit industry of this country, if any reduction was made in the duties on fruit coming into this country from foreign ports, and that while the duties upon fruit exported to the United States are in many cases prohibitory, the fruit growers of this country do not ask for any increase in the tariff, but would request that wherever possible specific duties be substituted for *ad valorem*.

"That this Association believes it desirable and in the interests of the fruit industry, and the general public of this country, that the Tariff Commission should recommend a reduction in the duty on refined sugar imported from foreign countries."

Mr. Haynes seconded the resolution, and suggested that a Committee be appointed to present same to the Tariff Commission. (Carried.)

The President named the following Committee:—Messrs. Bunting, Johnson, Peart, Thompson and Race.

REPORT OF NOMINATING COMMITTEE.

The Report of the Nominating Committee was presented by Mr. M. Pettit of Winona, who moved its adoption, seconded by Mr. T. H. Race, of Mitchell.

It was moved in amendment by Mr. Bunting, seconded by Mr. Thompson, that the names of the directors be taken up district by district. (Carried.)

Mr. Thompson moved, seconded by Mr. Andrew Haynes, that C. W. Vanduzer of Grimsby be reappointed director for division No. 8, instead of E. Morris, of Fonthill, the nominee of the Committee. The amendment was declared lost, and the motion to adopt the report was carried.

A special committee consisting of A. W. Peart, M. Pettit, and A. E. Sherrington, appointed to consider the interpretation to be placed on rule 10, of the Prize List, reported as follows:

"Your Committee recommends that the interpretation of rule 10 be left in the hands of the Executive and the interested exhibitors. Your Committee is of opinion that this is a matter which concerns these two parties only, and that it would be a waste of the time of the meeting to discuss it here."

PRESENTATION TO MR. W. H. BUNTING.

Mr. Alex. McNeill: Before taking up the report of the nominating committee, I wish to ask your attention to the reading of an address to Mr. W. H. Bunting, in which we have endeavored to convey in appropriate terms the high appreciation of the very valuable work he has been able to accomplish for the fruit growers in connection with transportation and other matters. None but those who have been officially associated with him can appreciate how much he has actually done, and I am sure you will agree that the address by no means overstates the facts of the case.

W. H. Bunting, Esq., Honorary President, Fruit Growers' Association of Ontario:

Sir,—We, the members of the Fruit Growers' Association of Ontario, assembled in Annual Convention, cannot allow the Annual Meeting of 1905 to pass by without recognizing in some way the splendid services that you have rendered through your official connection with the Fruit Growers' Association, not only to the members of the Association, but to every fruit grower in the Province. As President for the years 1903 and 1904, and Chairman of the Transportation Committee, you have been untiring in your efforts to secure for us some relief from the burdens imposed upon us by the transportation companies. The compliment extended to you by the Chairman of the Railway Commission, on your magnificent presentation of the fruit growers' case before the Commission in June, last year, was appreciated by the members everywhere, and we desire now to add our words of congratulation on the beneficial results that have followed your efforts.

We trust that you will long be spared to continue the good work which you have so well begun, and that, through your close connection with the fruit industry, you may with many others reap the reward of your labors in the improved transportation facilities and rates, which have resulted largely from your own exertions.

As an officer of the Association during the past four years you have voluntarily given up a great deal of your time to the furthering of the general interests of the Association. Several important schemes for the betterment of the lot of the fruit growers have been carried out during these years, and many others have been begun at your suggestion. Your good judgment and business-like methods while acting as chairman of our meetings have won for you the highest praise, and we desire to express at this time our most sincere acknowledgment of the untiring zeal with which you have labored on behalf of the fruit growers of Ontario.

In conclusion, we wish once again to thank and to compliment you upon the success which you have achieved in and for the fruit industry, and trust that you may live to see the efforts which you have put forth on behalf of this Association crowned with unparalleled success.

Signed on behalf of the Officers, Directors and Members of the Fruit Growers' Association of Ontario.

Alex McNeill, President.
November 16, 1905. P. W. Hodgetts, Secretary.

Mr. W. H. Bunting: I thank you, gentlemen, for the very kind expressions contained in the address which has just been read. It comes to me as a complete surprise and I feel myself quite incapable of expressing in words how much I value the appreciative statements it contains. I trust that I may be enabled in the future to join with you in your efforts to still further promote the welfare of the fruit growing industry.

REPORT OF COMMITTEE ON PACKAGES.

Presented by Robt. Thompson, St. Catharines.

Your Committee beg leave to report as follows: That the eleven quart basket has been found satisfactory as to size, etc.; that the law in regard to the 6⅔ quart basket be amended to read 5½ quart, and that the regulations regarding uniform dimensions as to depth, length and breadth and top and bottom measurements be made imperative on the manufacturers placing baskets on the market.

That the Association take steps to secure information as to best package to be used for carriers, for fancy fruit, for long distance shipment; also as to a suitable package for pears, the present standard package not being satisfactory.

Your Committee further recommends that barrels be made entirely of the 28½ inch stave, with a capacity of 96 quarts, instead of the two sizes now used.

The reason for desiring uniformity in the different makes of baskets is because in loading a car it is found very difficult to pack different sizes and shapes together. The reason for the suggested change in the size of the smaller basket is that we find that, with the exception of one or two factories, the 6⅔ quart basket is no longer made, and that the 5½ quart has taken its place.

Major Sheppard: We have five different makes of basket in our section, every one of different size. What is required is that the dimensions of the standard baskets should be made uniform.

Mr. Eaton: I quite agree that it would be a desirable thing to have baskets of a uniform shape, size and make, and am quite sure that the manufacturers are perfectly willing to do whatever is required of them by the growers.

A Basket Manufacturer: I do not suppose that manufacturers would object if they were compelled by law to keep to standard sizes, but I do not see what there is to prevent the consumer using imported baskets that do not conform to the requirements. I quite concur in the recommendation of the report that these packages should be made uniform. The tendency has been that the manufacturer who produces the smaller basket gets the trade. That is not right, and the law, whatever it is, should be enforced.

Mr. Everist: I would advocate that the Minister of Agriculture should bring in a law regulating the size of fruit packages, but my idea is that such a law should go still farther and stipulate the number of quarts a package should hold. I am very much in favor of the passing of a law compelling every manufacturer to make peach, plum and grape baskets uniform in size in all particulars. Then, if in compliance with the specific requirements of customers for special markets, other sizes are manufactured, compel him to put on the outside of the package in quarts just how much the package holds. Then the purchaser or shipper knows exactly what he is getting. As to undersized baskets I am disposed to lay the blame on the grower or shipper, as the manufacturer is only seeking custom and is willing to make what his customer wants.

Mr. Ford: We are trying to conform to the law in regard to the sizes of baskets, and in my opinion the grower is to blame for baskets being under size, as they want a small-sized basket so as to get the better of their neighbor in shipping fruit. If one manufacturer will not supply what they want they go to another. In my opinion the basket should be long enough on the top so that you can cross four and they do not dip in. They should also have a first-class cover; some are not up to the mark in this respect; and should be of a standard size throughout.

Major Sheppard: As to the responsibility for the small basket, I find that basket agents go around and by packing a basket, show the grower that he can save four to six peaches in every basket by using that particular make. This has been done all over the country.

Mr. Haynes: With reference to the package for pears, I may say that I saw the expert packer from British Columbia packing the fruit, and after he had shown what he could do with apples and pears in certain boxes, I asked him to pack a basket for us. After spending half an hour in a vain attempt he had to throw it up. In his opinion, while it might be a satisfactory package for peaches, apples or plums, it was altogether unsuitable for pears. I think this is on account of the flare in the basket. The baskets made by some factories have altogether too much flare.

A Manufacturer: In my experience I have found the eleven quart basket a very popular one. It is well proportioned and gives good satisfaction in our district. We went to great expense in changing our forms and dies in order to manufacture the 6⅔ quart basket, and afterwards found that we could not sell it in competition with the smaller American basket. I will admit that since then we have been violating the law. I think it would be well if the Association would form a committee which would secure samples of all the different makes of baskets. Hardly any two manufacturers use the same forms and each will contend that his is the best because he does not want to go to the expense of changing his forms and dies. Your Committee could then decide as to the best shapes and sizes, and the manufacturers would govern themselves accordingly.

Mr. Carey: I was entrusted with the work of investigating the different makes of baskets. I visited nearly all the factories, and found that the reputed eleven quart basket ranged from nine to thirteen quarts in capacity.

All but four manufacturers were making them large enough or too large. The use of the thirteen quart basket was a greater hardship to the grower than the 10½ quart basket was to the consumer. I am in favor of each manufacturer being furnished by the Committee with the exact dimensions of the approved size, and that the inspection be of the pattern used, rather than of the output. This would very much reduce the work of inspection. I am in favor of the Committee deciding on dimensions and having every manufacturer adopt them.

The Chairman suggested that this point be referred to the Committee that was to meet that afternoon with the manufacturers.

Mr. Benning: In regard to the half pear case, I have been using it this year with very satisfactory results. I find no trouble in filling the case with any sized pear, except it be one of very large size, such as the Duchess. It is also uniform with the apple case, being the same in length and width.

Mr. Thompson maintained that pears could not be properly packed in the present half cases, and stated that this fact was demonstrated by fruit on exhibition at the Show, which had not received first prize simply because it was impossible to pack it satisfactorily. If we are to ship our fruit to the western markets we must adopt the size of box in general use in those markets, and give the buyer and the merchant what they want and are willing to pay more for.. Your Committee did not feel like recommending any particular size of box until more information was gained. He suggested that this point be referred to the Committee also.

The question of the most desirable length of barrel stave was then discussed. The present law requires as a minimum size a 28½ inch stave, whereas the ordinary Ontario barrel has a 30 inch stave. Mr. Sherrington stated that during his visit to Great Britain, merchants had advised against changing the size of the Ontario barrel, as they claim to prefer it to the Nova Scotia or the American barrel. He further stated that the Ontario barrel was well known there, and had the preference in all the markets and that buyers would pay more for it.

Mr. Innis was of the opinion that the 30 inch barrel although it held two quarts more fruit did not bring a penny more than the twenty-eight and one-half inch in the English market. He claimed that a 28½ inch barrel of the proper build, so that it would not crush in, was the best one that could be obtained, and would bring just as much as the larger size. He further took exception to the statement that more was paid for the Ontario barrel than for the Nova Scotia.

Mr. Carey stated that his observation was that the Ontario barrel brought from one to two shillings more. He did not consider there was this difference in reality, but that when the two barrels were placed side by side the difference appeared to be greater than it really was. He stated that he had done everything he could to discourage the use of small barrels in Ontario, and thought that one or the other should be uniformly adopted.

Mr. Innis suggested that the small barrel quoted at one or two shillings less was what was known as the West Virginia barrel with a 16½ inch head and a 27½ inch stave.

Mr. Wilson, of Seaforth, was of the opinion that the old country merchant would not pay as much for the small barrel as for the larger one.

Mr. Caston thought that a barrel 19 inches across the bilge, 17 across the head, and a 30 inch stave was about right. He objected to too much bilge as when such barrels where packed in tiers those at the bottom were severely squeezed.

Mr. SHERRINGTON also advocated the smaller proportion of bilge. He thought that four hoops would be an improvement as they protected the fruit in the event of the barrels being rolled, which, however, should never be permitted.

Mr. RUDDICK pointed out that the present law was passed on the recommendation of the fruit growers, and that it was not likely that the Government would decide to change it without some very important improvement was to be had. He did not know whether the intention was to instruct the Association's delegates to the Ottawa conference to take some action in this regard, or whether it was merely a discussion to ascertain the opinion of the members of the Association. When it came to the question of barrels the Nova Scotia men had to be considered, and they were very hard to convince on some of these points.

On motion it was decided to refer the matter to the consideration of a committee to be appointed before the close of the session.

REPORT OF COMMITTEE ON MARKETS AND MARKETING.

Your Committee on Markets and Marketing beg leave to report that we recommend this Association to press upon the Dominion Conference of Fruit Growers for a vigorous campaign in conjunction with the Dominion Government to exploit the apple markets of Europe, Great Britain and South Africa.

To appoint agents whose sole duties will be to open up markets in these countries. To ask the Government to continue to improve the conditions of cold storage for tender fruits, so that the shipper may have the best facilities for reaching the markets of the world.

REPORT OF THE RESOLUTION COMMITTEE.

To the Officers and Members of the Ontario Fruit Growers' Convention.

Your Committee on Resolutions beg to submit the following:—

(1) That Messrs. McNeill, Race, Woolverton, Groff, and Dempsey be appointed a Standing Historical Committee. That it be the duty of this Committee

(a) To prepare as occasion arises, for publication in the annual reports of the Associations, sketches of the life work of those who have rendered distinguished services to the cause of Horticulture.

(b) To provide for the erection of suitable tablets to mark the place of origin of varieties of fruits, which have proved of special value.

(c) To prepare for our next annual report, a biographical sketch of the late D. W. Beadle, who during his life distinguished himself as a fruit grower, nurseryman, editor of *The Canadian Horticulturist,* and officer in the Fruit Growers' Association.

(d) To prepare a life sketch of our esteemed member, A. M. Smith, the father of the commercial peach-growing industry of Ontario.

(e) To arrange for the erection of a tablet marking the site on which the original McIntosh Red apple still stands, and that whereon the first Windsor Cherry tree sprang into life, grew and died. Carried.

(2) That we express our most sincere appreciation of the value of the work done during the past season by the Fruit Division of the Dominion Department of Agriculture in arranging for the publication, at frequent

intervals, while the growing season was on, of reports upon the fruit crop prospects as they appeared from time to time. We trust this system of crop reporting will be continued and extended as the effect of it is to place the rank and file of producers, so far as regards knowledge of the situation, on a footing of comparative equality with those to whom they sell.

Mr. Sherrington: I have found these reports of great value to me. I govern my sales and prices in accordance with the information they contain. They were particularly valuable to me this year on account of the short apple crop.

Mr. McNeill: The reports are compiled from the returns made by about five thousand correspondents, and in these reports I have tried to present a consensus of the opinion given. Not a hint of the nature of the information gained is given out until such time as the whole becomes public property and the dealer and producer receive it at the same time. I feel that this work should be supplemented by the statistical departments of the Provincial Governments, as it is desirable that the producer should be put in possession of absolutely accurate and early information regarding the crop. The resolution then carried.

(3) That we desire also to congratulate the Dominion Department of Agriculture on arranging for informal but effective supervision of the work of transferring fruit shipments from rail to steamer at Montreal. This work, so well done, has been of inestimable benefit to fruit growers in preventing serious loss by damage in course of transit. Carried.

(4) That we desire to put on record an expression of our thanks to the railway companies for the courtesy which they have shown to the representatives of this Association from time to time and for the earnest effort they have made, during this year, to provide an improved service in the carriage of our perishable fruits. Carried.

(5) That it be a specific instruction to the delegates, who go from this Association to the Dominion Fruit Conference, to be held in Ottawa early next year, to bring before that Conference the desirability of securing at the forthcoming session of Parliament, legislation, under which express rates will be placed within the control of the Railway Commission, and that our delegates to said Conference be urged to endeavor to arrange for a deputation from the whole Conference to wait upon the Government, to urge the adoption of that which is herein recommended. Carried.

(6) That our delegates to said Conference be urged to bring before the body to which they are accredited, the desirability of securing legislation under which provision will be made that will insure just returns from the commission men for the fruit consigned to their care. Carried.

(7) That the Executive of this Association be instructed to wait upon the proper railway officials with a view of securing the privilege, now accorded other agricultural societies, of free return tickets from our annual convention without regard to the number in attendance. Carried.

(8) That the thanks of this Association be tendered to those organizations which have sent delegates to the present Convention. Among these organizations being Quebec Pomological Society, represented by Norman E. Jack; Michigan Horticultural Society, represented by L. B. Rice; Woodstock Horticultural Society, represented by J. S. Scarff; Chatham Co-operative Fruit Growers' Association, represented by W. D. A. Ross; Forest Co-operative Association, represented by D. Johnson; Orillia Horticultural Society, represented by C. L. Stephens, and Burlington Society, represented by W. E. A. Peer. Carried.

(9) That we heartily approve of the educational work carried on in connection with fruit-growing, through the Farmers' Institutes and Fair Systems of Ontario, and express the hope that Messrs. Putnam and Cowan may be able to see their way clear to continue and extend this work along the same lines in future. Carried.

(10) That we desire to express in special manner our appreciation of the services rendered the whole fruit-growing industries of Canada by Alexander McNeill as an officer of this Association for many years and also as chief of the Fruit Division at Ottawa. We believe the prominence our industry now occupies in the public view is very largely the result of the efficient, unselfish and never-ending labors of our retiring President.

This resolution was moved by Mr. Stevens of Orillia and seconded by Mr. Peart, of Burlington, who both spoke in the highest terms of appreciation of the services of Mr. McNeill.

In supporting the motion Mr. Bunting said that he was in hearty accord with the sentiments expressed. He for one appreciated very much the unselfish service Mr. McNeill had given to the Association and the cheerfulness with which he had taken hold of anything that promised to benefit the fruit grower. He said "I have given special attention to the statistical reports prepared by his Branch, and I must say that for accuracy and comprehensiveness we never had anything in this country to compare with it, and I feel that this resolution is quite in accord with the wishes of the fruit growers generally."

Mr. Groff: As the representative of a different branch of horticulture, I may say that I heartily approve of this resolution. I have been especially impressed by the courteous consideration given to every interest that it was possible to serve by his Department or in his position as President of the Association.

Mr. Armstrong: What the rank and file of the fruit growers particularly appreciate in Mr. McNeill is his wonderful energy.

Mr. Norman E. Jack, delegate from the Quebec Pomological Association: As the representative of a sister Province, I can heartily endorse this resolution, and am assured that the other members of my Association would do so as well.

The resolution was then carried unanimously by a standing vote.

Mr. J. S. Scarff, acting Chairman, presented the same to Mr. McNeill, who said in reply: I can assure you that this resolution is a complete surprise to me. I had some little oversight of the work of the various committees, among others that of the Committee on Resolutions, but I had no idea that their report contained a resolution such as the one which has just been voted on. I thank you most heartily. I have perhaps done some little work in the interests of the fruit growers, but can assure you that I have been amply repaid by the appreciation which I have met with all through my work. While I appreciate this resolution most heartily, I appreciate equally the very warm sympathy which has been apparent to me day by day as I came among you. This in itself constitutes a very large part of the reward of my labors. Whether I am President of your Association or not, my interest will still continue, and my services are at your disposal and always will be.

(11) That your delegates to the Dominion Conference be instructed to gather all information possible with regard to the workings of the Fruit Marks Act in the past and to give careful consideration to the advisability of defining XX apples in barrels and boxes.

Mr. Harold Jones: There is a feeling, particularly among the dealers, that the XX apple should be defined by the Fruit Marks Act, and as this matter will doubtless be discussed at the Dominion Conference, it would seem wise for the Association to instruct its delegates whether to favor such definition or whether the Act should stand as it is in this regard. Under the present Act all that is required in a XX apple is that the face should fairly represent the contents of the package. In my opinion the definition of a XX will lead to many difficulties as the question has to be considered with reference to varieties.

Mr. Peart: I do not think that the time has come to define the XX grade, but that it would be premature. I think that first of all sufficient time should be given to establish thoroughly in the public mind the definition of the XXX grade. There are too many difficulties in the way at present to attempt it, and for that reason I think the Association should instruct the delegates to oppose any such definition.

Mr. Sherrington: I am of the same opinion. I have studied this question considerably and have discussed it with the officers of the Fruit Division, but have not yet arrived at a satisfactory solution. I think that co-operation on the central packing house system will work this matter out in time. These Associations will desire to secure a reputation for their number XX grade just as much as for the number one.

Mr. Lick: I should very much object to putting up No. 2 apples according to any definition I have yet seen.

Mr. Tweddle: My idea of a number two apple is that it should fill the demands of people who cannot afford to pay for the No. 1 grade. If the No. 2 is ever defined, it ought to be with this end in view. It should sell, as a general rule, at two-thirds the price of No. 1, and the consumer should get two-thirds the value of a No. 1 apple. I cannot support the contention that it should be like a number one in all respects except as to size, as that would exclude a large number of apples from being sold in packages at all, which at the same time would be quite satisfactory for the purpose I have indicated.

Mr. McNeill: I took the trouble to secure the views of about fifty prominent shippers and growers. The majority of them say by all means define the No. 2 apple, but no two of the number agree as to what the definition should be. I think you can leave this matter very fairly in the hands of your delegates, as I am sure you will not select anyone who would act upon insufficient data. My view is that we had better go slowly in this matter until we are convinced that we have the support of public opinion. Until that time arrives I shall oppose any attempt in this direction, and I am quite in sympathy with the conservative views which have been expressed.

The resolution was then carried.

(12) That we approve the suggestion contained in President McNeill's address that an expert officer be appointed to take charge of the work of the Ontario fruit experiment stations and horticultural work of the Province generally.

Mr. Pettit: Is it proposed that this official should be a man thoroughly posted in hybridization work, one who could work in conjunction with the Experiment Fruit Stations and make them more valuable by conducting or supervising a series of experiments? If so, I think he would be a very valuable officer. There is room for a lot of work of this kind in Ontario. Our experiment stations have pretty thoroughly tested varieties during the ten years in which they have been in existence, and it would seem that the time has come when work of the kind I have indicated would be of great benefit.

Mr. R. B. WHYTE: What is wrong with the present system?

Mr. McNEILL: So far as I can judge from the criticisms expressed, it has worked very well up to date, but they have now reached the limit of the series of experiments, and a new lease of life is looked for by the appointment of an expert, who is thoroughly competent and trained to take up new work of the kind suggested.

Mr. WALLBRIDGE: Are they not doing work of that kind at the Farm at Ottawa and also at the College at Guelph? It seems to me that the kind of man we want is one generally qualified in fruit-growing matters, who could go about the Province giving instruction and advanced information. It seems to me that the kind of a man Mr. Pettit speaks of should be connected with the Experimental Farm, either at Guelph or Ottawa.

Mr. McNEILL: As I understand it, the idea would be to attach a man to the College at Guelph with the intention that he should unify the work of the experiment stations and get the best that there is out of the system we now have.

Mr. W. E. WELLINGTON: It seems to me that the resolution is on the right lines. I am satisfied that, so far as the experiment stations are concerned, they are at a dead stop and that nothing is being done to extend the work. Such an officer, provided always that he is qualified and that the Minister of Agriculture is willing to incur the additional expense, is, I think, just what is wanted. The experiment stations at Ottawa and Guelph are doing important work, but they are not situated so as to be of general benefit to the fruit-growers of the country. This is the reason why the experiment stations were established in the first place. The experimenters should receive better pay than they are getting and there should be some one to oversee operations so that we may get an expression as to the value of new varieties from year to year. We want everything new tested and the tests made in a proper way. I think that the work of the stations should be carried on on a more extended scale and that the men who are running them should be paid something worth while. In my opinion parsimony in this connection simply nullifies the good results that should be obtained from the work of these stations.

Mr. TWEDDLE: It seems to me that work should be conducted along the line of new varieties. We need new varieties especially in plums, peaches and grapes, that will carry to distant markets. In peaches we have only one variety that will carry to the Northwest. Work of this kind might be profitably undertaken by such an officer.

Mr. GROFF: If I properly understand the matter, one of the chief objects in view is to centralize as far as possible the knowledge and information gathered by the units and groups throughout the Province with the idea of taking advantage of the knowledge and material produced by various sections of the country in order that it may be made of benefit to the Province and Dominion. The point is a very important one. In my own experience, in connection with my specialty, the expense of informing myself as to what others were doing, what could be done and what was needed, was very great. Such a system as is proposed would doubtless result in placing all the information available before the fruit-grower, and if so, it would be an exceedingly valuable movement.

Mr. JONES: I think Mr. Groff has touched the keynote of the situation. He has touched the point that means advancement in regard to the general knowledge of the fruit-growers of this country. The desirability of varieties for certain localities is a matter which the majority of fruit-growers know little or nothing about. There are certain sections or geological formations where certain varieties grow to much better advantage than elsewhere. In my opinion the geological formation has more influence on some varieties than climate has. We have a range of hills in the eastern part of the Province where the rock formation is richer in phosphates than will be found anywhere else in North America, and these rocks have influenced the soil in the locality and it will grow apples of the Wealthy and McIntosh Red varieties that are of crisper flavor, higher color and more desirable in every way than the same varieties grown in sections where the chestnut will grow. What do we know about that as fruit-growers? What data have we to show the geological formation of the Province as it concerns fruit-growing? What data to show why an apple grown in one locality is vastly superior to a similar apple grown somewhere else? A man who is properly trained in horticulture and properly qualified to superintend, could guide the work of each individual station taking into consideration the geological situation. He could take an apple such as the Wealthy and ascertain and compare its qualities in different localities, and he could in time work out a map of the Province showing the geological formation and its relation to the data secured. Men will plant varieties which they hear are proving to be money-makers, perhaps one hundred miles away, and there is more money lost in fruit-growing because of this than perhaps from any other reason. I believe that the right man with the right ideas and a definite object in view could guide the experimenters and tell us what to do. We are set down in a little corner of the world and do not always know what is going on around us, with the result that unless we are instructed to do certain things we probably do little or nothing.

Mr. Pettit moved that a committee, consisting of Messrs. McNeill, Wellington, Hilborn, Jones and Groff be appointed to formulate a proposal and to lay the same before the Minister of Agriculture. The resolution was seconded by Mr. Peart, and carried.

SUPPLEMENTARY REPORT OF THE COMMITTEE ON RESOLUTIONS.

Your Committee on Resolutions beg leave to submit the following additional resolutions:

(1) That owing to the extreme scarcity of labor during the height of the fruit season, a scarcity involving the loss of large quantities of a valuable product, we are of opinion that the Dominion Parliament should be petitioned to allow the importation of labor from North Europe under contract during the continuance of the fruit season.

(2) That the delegation appointed to appear before the Tariff Commission be instructed to urge upon the Commission that the importation or sale of adulterated fruits be prohibited save where the cans containing such fruits show on the label the contents of the package.

(3) That this Association desires to congratulate Mr. T. H. Race on the extremely able manner in which he represented not only the fruit-growing industry, but the whole of Canada, at the St. Louis Exposition, at Liverpool, and again at the recent Exhibition at Pittsburg. This Association has pleasure in testifying its belief that Canada is always worthily represented and the fruit-growing industry has a special champion when represented in the person of Mr. Race.

(4) That we desire to place upon record our recognition of the value of the service performed by the Department of Agriculture of Ontario, in collecting this year, apple statistics showing numbers of trees and varieties of fruit and further statistics relative to quantities and prices of fruits purchased from growers by proprietors of canning factories, and also in the operation of power sprayers at Meaford and Trenton.

(5) That we as fruit-growers, to whom a prompt mail service is of vital importance, would respectfully but most strongly urge Hon. Mr. Aylesworth, Postmaster-General, to secure legislation authorizing the inauguration of a system of rural mail delivery.

EXPERIMENT STATION FOR SOUTHERN ONTARIO.

A resolution was presented urging upon the Provincial Government the necessity for establishing an experimental fruit station for Southern Ontario. Mr. Alexander McNeill, speaking in opposition to the motion, pointed out that Ontario already had a system of experiment stations, two of which were located in the southern section. He thought that as the Association had already passed a resolution in favor of the appointment of an expert horticulturist, with a view to making the work of the stations of greater value, to pass such a resolution as the one indicated above would have the effect of making the Association look somewhat foolish. Mr. Tweddle stated that he believed the Association had taken the right course in recommending the appointment of a horticultural expert, but he considered that so far as the southern section was concerned, more than this was required. He stated that there was great need for improved varieties of peaches, plums and grapes which would carry to the markets of the Northwest. For example, they needed early and late peaches of a quality as good as the Crawford that would carry to these distant markets. There was at present nothing to meet the requirements and it was very much the same in regard to plums and grapes. He considered, therefore, that the work of experimentation should be taken up and carried out on a larger scale in the district. In reply Mr. McNeill maintained that this was exactly in the line of work which was proposed for the horticultural expert. He agreed that the objects suggested by Mr. Tweddle were of the utmost importance, but as two stations were already established in the district, what was proposed was to make these stations accomplish the work Mr. Tweedle desired to see performed. The resolution was finally withdrawn by consent of the committee.

COVER CROPS: THEIR RELATION TO THE FERTILITY AND MOISTURE-CONTENT OF ORCHARD SOILS.

By Frank T. Shutt, M. A., Chemist, Dominion Experimental Farms, Ottawa.

The development of the fruit growing industry in Canada during the past fifteen years has been marked by, or I might say has in a large measure been the outcome of, certain advances in the rational treatment of our orchards. We all recognize that much has been accomplished through the adoption of improved methods of picking, sorting and packing, by better storage and transportation of the fruit; but this acknowledged, we must realize that the more recently introduced methods of soil treatment in the orchard and the keeping in check of insect and fungus pests by spraying, have had very much to do in the production, both as to quality and quantity, of our marketable fruit.

In these matters of soil management and spraying, fruit growers are much indebted to scientific research, and, speaking generally, we have not been slow to put into practice the methods indicated by the results of investigations carried on in American—I use the term in its geographical sense—agricultural institutions. Very much good work has been done in the Experiment Stations of the United States, but we have also in Canada contributed our part toward that knowledge that we now possess regarding the rational growing of fruit. The Canadian agricultural institutions, Federal and Provincial, have recognized that our conditions necessitated in many instances modifications of the general plan; that our problems called for a special solution, and as a result they have, I believe, done most useful work towards putting fruit growing on a paying basis.

It must not, however, be lost sight of that it is necessary, each one for himself, to do a certain amount of experimental work. The principles can be established from the researches of the trained expert who has all the necessary apparatus at hand to assist him, but in the application of these principles, if we would obtain the best results, there must be brought to bear the intelligent study by the individual, for there are many soils and many climates in our fruit growing districts. I am careful to emphasize this aspect before bringing to your notice the data of our experiments, lest any should suppose we are laying down a hard and fast plan of procedure suitable to all alike.

It is my purpose, then, to-day to present in brief form certain of the chemical data we have obtained on the Dominion Experimental Farms relative to the enrichment of the orchard soil, and the control of its moisture through the use of cover crops. In the main I shall let the facts speak for themselves, indicating merely the deductions that may be made therefrom and the broad principle they support.

The term cover crop was, I believe, first used by Prof. Bailey, of Cornell University, in 1892, who was then advocating the breaking away from the old plan of keeping orchards in sod. His suggestion was to grow a crop in the late summer and autumn which would afford a winter protection to the roots of the trees and at the same time enrich the soil. Such a crop he designated a "Cover Crop." Prior to that time the general practice no doubt was to utilize the soil of the young orchard for some vegetable or farm crop; when the trees had attained such a size that this was no longer possible or profitable, the orchard was allowed to grow a sod—the grass being pastured or cut and cured according to the fancy of the owner. Occasionally the orchard received a dressing of barnyard manure, but this unfortunately, was the exception rather than the rule, it being scarcely recognized that our orchard trees required to be fed, as other farm crops. There are, no doubt, to-day many good orchards in sod, but their number is steadily decreasing; and we find the majority of advanced orchardists abandoning the old method, and employing some modification of the cover crop system.

There are several reasons against a permanent sod in the orchard. One is that the grass is robbing the trees of that moisture and plant food necessary for their legitimate growth and for the production of fruit. I shall show you later from our experiments that sod, and especially an old, established sod, very rapidly exhausts a soil of its moisture. The loss takes place partly by transpiration through the leaves of the grass, and partly through capillarity and surface evaporation. In consequence of this the trees suffer in seasons of insufficient rainfall. In an orchard covered with sod it is true that the tree roots are nearer the surface than in a cultivated orchard, but nevertheless it is an unequal battle between them and the grass, with the result that the moisture is entrapped and used by the grass—*and this, as a rule, just at that time when the trees are needing it most*, viz., from May to July. As to the extraction of the elements of fertility from the soil by the grass, I have only to point out that a yearly yield of two tons of timothy hay per acre will remove in ten years about 600 lbs. of nitrogen, 400 lbs. of phosphoric acid, and 900 lbs. of potash. There are, I know, soils so well supplied with moisture and so rich in plant food that the newer method of which we are speaking is not necessary, but such soils, we are assured, are by no means common.

Objects Obtained by Cover Crops and Cultivation. As you are well aware by this system the land is part of the year under a crop and part under cultivation. We seek thereby to (1) enrich the soil in humus and nitrogen; (2) to regulate or control the soil moisture; (3) to furnish protection to the tree roots during the ensuing winter; (4) to arrest the loss through the leaching of the nitrates in the autumn. It is only with respect to the two first named features that this paper deals. The data have been obtained in the orchard and the laboratory during the past ten years, and in all this work I have had the advice and co-operation of my colleague, Mr. W. T. Macoun, Horticulturist, of the Experimental Farm, Ottawa, whose interest in these investigations has throughout been most enthusiastic.

The Cover Crop System: In outline the treatment of the orchard soil is as follows: The land is kept thoroughly cultivated throughout the spring and early summer months, say, until early in July. This conserves the moisture for the growth of the trees, favors aeration of the soil and nitrification of the humus. The cover crop is then sown. This is preferably one of the legumes. The crop is, as a rule, allowed to remain until the following spring, possibly till the second or third week in May, when the growth is turned under and the soil cultivated as many times as is deemed necessary until the beginning of July, when a cover crop is again sown. The growth of the cover crop in late autumn abstracts much moisture from the soil, naturally checking growth of the trees and thus indirectly causing the early ripening of their wood.

The dates of these various operations are by no means fixed; they will naturally depend on the condition of the soil and the district in which the orchard is situated. Thus, if a drought is not unusual in the early summer months, plowing under the cover crop should not be later than the middle of April—even if there then be little or no spring growth. By this means a dry earth mulch may be maintained by cultivation which will conserve the moisture from the winter's snow and early spring showers. On the other hand, if a generous and well distributed rainfall may be expected, the clover or other legume may be allowed to remain throughout the summer, mowing the crop occasionally and leaving the cut material as a mulch. The system allows of much modification, and in this lies one of its best features; it lends itself readily to adaptation. The observant eye of the orchardist must note the necessities of his trees, the characteristics of his soil, the climatic conditions prevailing in his district—the practice may then be adapted accordingly.

The Enrichment of the Soil. Why should it be necessary to enrich the orchard soil? In the first place because there is an annual draft upon the available soil plant food by the trees. We have done a considerable amount of work on the chemistry of the apple, and I compute from our analyses that the following amounts of the essential elements of fertility are removed in ten years per acre: i.e., by forty trees, when the orchard is in full bearing: Nitrogen, 600-650 lbs., phosphoric acid, 135-150 lbs., potash, 700-850 lbs. These amounts are, of course, distributed between root, trunk, branches, twigs, leaves and fruit; a part is locked up in the wood of the tree, a part is lost in the leaves and fruit. Compared with other farm crops, the orchard is not exhaustive in the sense that that term is usually applied, but nevertheless our results show the necessity for a continual supply of plant food in an available form.

Some years ago we analyzed four well known varieties of apples, and from the data then obtained, and assuming a yield of 160 barrels per acre, I calculate that the amount of plant food removed in the fruit from this area, per annum, would be from 9 to 10 lbs. nitrogen, 5 to 6 lbs. phosphoric acid, and 32 to 35 lbs. potash. These amounts, as you will notice, are by no means excessive.

We also analysed the leaves of the apple tree, collected in May and September. We found that as the leaves ripened there was a considerable return of the plant food they contained to the wood, so that the fallen autumn leaves are not as rich in potash and phosphoric acid as when they were younger. However, a 1,000 lbs. of the leaves in September, still green and containing 60.71 per cent. of moisture, would contain nearly 9 lbs. of nitrogen, almost 2 lbs. phosphoric acid, and approximately 4 lbs. of potash. It has been estimated that in the fallen leaves per acre an annual loss may ensue of approximately 23 lbs. nitrogen, 6 lbs. phosphoric acid, and 12 lbs. potash. A part of this may, of course, be returned to the soil, but owing to high winds in the autumn it is extremely doubtful if much of it gets back to where it came from, unless there is a cover crop to hold the flying leaves.

So far as the soil is concerned, the plant food stored in the wood and that in the fruit must, of course, be regarded as lost.

Without unduly lengthening this paper we could not now stop to discuss in any detail the losses of soil plant food in other ways. If the orchard is in sod and the hay removed, the exhaustion is greater than that incidental to the growth of the trees. If, on the other hand, the soil is continuously under cultivation there necessarily follows a very considerable loss of nitrogen and destruction of humus. This fact we have recently established in the Experimental Farms laboratories. It is very evident, therefore, that under all ordinary conditions there must be a return of plant food if the orchard is to thrive. We think this in the majority of instances can be accomplished in the most economical way by the growth and turning under of one of the legumes. This class of plants might be known as nitrogen-collectors, for they are able through the agency of certain organisms (bacteria) that reside in their roots to appropriate and build up into their tissues free nitrogen from the atmosphere.

THE FUNCTIONS OF HUMUS IN THE SOIL. Before speaking more particularly of our data regarding the amounts of nitrogen that can be added to orchard soil by the leguminous cover crops, I would for a moment emphasize the importance of humus as a soil constituent. Every arable, every fertile soil consists of two classes of constituents: broken down rock matter, i. e., disintegrated and semi-decomposed rock matter, and semi-decayed vegetable matter, commonly known as humus. We have had investigations in hand for several years, more particularly at Indian Head and Brandon, because there they follow the system of fallowing. This we find is very hard upon the soil and that there is more available matter destroyed and more nitrogen dissipated by fallowing than is removed by the crop of grain. Whatever destroys the humus in the soil, dissipates the nitrogen. When by excessive cultivation we let the air into the soil just as we open the damper of a stove, we destroy humus and dissipate nitrogen. Every favorable soil contains a large number of micro-organisms. Without the humus, they cannot live; it is their food. Consequently if we would have that agency which nature has provided for the conversion of insoluble plant food into available forms, we must have humus, for these organisms to live upon. Most of the potash and phosphoric acid used by plants is not taken directly from the undecomposed rock material, but is taken from the humus as it exists there in a more soluble form better adapted for plant food. Humus is not only the source of nitrogen, but also largely the source of potash and phosphoric acid. Very briefly, the functions of humus are as follows:

1. It conserves the nitrogen. Soils rich in humus are those rich in nitrogen, and vice versa. Whatever destroys the humus, dissipates the nitrogen.

2. It increases the absorptive power of soils for moisture—and this whether they be clays or sands.

3. It improves the tilth or mechanical texture of soils, mellowing them and making them more friable, and better adapted for root extension.

4. It makes possible the life of those soil organisms whose function it is to convert insoluble, unavailable soil constituents into soluble, available forms.

5. It furnishes in its further decomposition not only all the nitrogen used by our crops, but also the greater part of the phosphoric acid, potash, lime, etc., required by them.

The mineral matter in humus is not large, but it is readily transformed into available compounds.

6. It regulates soil temperature, preventing rapid changes.

7. It diminishes the loss of plant food by drainage.

Recognizing, then, the importance of humus and the fact that it may be readily dissipated, it is encouraging for us to know that by the growth, say, of one of the clovers, we can add in one season from 1½ to 2½ tons of organic matter per acre, and that this will in a short time become part and parcel of the soil's store of humus.

THE LEGUMES AS NITROGEN-ENRICHERS. Our work in the estimation of the nitrogen furnished by the legumes was begun in 1894 and has been continued more or less every year since that date. The results of these investigations, carried on simultaneously in field, orchard and laboratory, are to be found in the Reports of the Experimental Farms, and consequently there is no occasion to bring them before you in detail to-day. To simplify matters, eliminating much that we could not discuss to-day for lack of time, I have constructed the following table. It states the yield, the nitrogen, the organic matter, and ash constituents contained in various legumes after three months growth, viz., from 1st July to 1st October, in the orchard.

Orchard Cover Crops—Central Experimental Farm, Ottawa.

Period of Growth: July 1 to Oct. 1. (approximately).	Weight of Crop per acre.		Nitrogen per acre.	Organic Matter per acre.	Mineral Matter per acre.
	tons.	lbs.	lbs.	lbs.	lbs.
Clover, Common Red:					
Stems and leaves	4	1,779	70	1,824	481
Roots	2	1,445	48	1,394	172
Total	7	1,224	118	3,218	653
Clover, Mammoth Red:					
Stems and leaves	6	1,310	82	2,269	508
Roots	3	1,260	48	1,409	219
Total	10	570	130	3,678	727
Clover, Crimson:					
Stems and leaves	11	234	85	2,093	602
Roots	3	201	19	801	199
Total	14	435	104	2,894	801
Alfalfa:					
Stems and leaves	5	1,192	75	2,664	510
Roots	5	558	61	3,120	613
Total	10	1,750	136	5,784	1,123
Hairy Vetch:					
Stems and leaves	11	1,895	129	3,689	425
Roots	2	345	18	536	56
Total	14	240	147	4,225	481
Soja Beans:					
Stems and leaves	7	350	82	3,319	313
Roots	1	900	13	549	28
Total	8	1,250	95	3,868	341
Horse Beans:					
Stems and leaves	7	733	63	2,193	156
Roots	2	852	15	605	39
Total	9	1,585	78	2,798	195

These results are to be considered as representative rather than absolute; they have been obtained in several instances by averaging the data from two or more seasons. We find, as might be expected, that results vary according to the nature of the soil and of the season, and the abundance of nitrogen-gathering bacteria in the soil. Again, although the table gives a larger crop yield and nitrogen content for the Mammoth Red than for the Common Red clover, it must be pointed out that several of our experiments have shown the reverse. If it had been possible to determine the relative values of these legumes upon soil alike throughout all the plots and during the same season, the data might have been more strictly comparable, but this was not possible.

We cannot state exactly what proportion of the nitrogen as recorded in the table, has been drawn from the atmosphere, or to put it in another way, what proportion previously existed in the soil. The probabilities, however, are that the greater part of it is from the air. This assumption is made from the fact that the increase in nitrogen content of a soil by the turning under of clover has been found almost equal to the amount of nitrogen contained in the clover. Experiments conducted during the past three years show that by the decay of turned-under clover the nitrogen of the soil has been increased on an average to the extent of 85 lbs. per annum. A consideration of all our data leads me to the conclusion that according to the nature of the soil and the character of the season we may enrich the orchard soil with from 75 lbs. to 125 lbs. of nitrogen per acre by one of the legume crops. This amount would be contained in 8 tons to 10 tons of fairly good barnyard manure.

It is a significant fact that in the case of the two clovers—Mammoth Red and Common Red—practically one-third of the total nitrogen is in the root system. Undoubtedly these two are the most commonly useful of all the clovers as orchard cover crops.

Crimson Clover seldom survives the winter in the colder districts, and consequently gives no spring growth. Neither does it, as a rule, furnish as much nitrogen by its summer and autumn growth. Its root system does not equal those of the two first-named clovers.

Alfalfa on suitable soil has done very well, furnishing somewhat more nitrogen than clover, half of which is contained in the extensive root system. From all points of view it is undoubtedly a most valuable cover crop.

The Hairy Vetch, though a low growing plant, has given most excellent yields—nearly 12 tons of foliage per acre, containing more than two tons of humus-forming material. This foliage is very rich in nitrogen, the crop containing 150 lbs. of this element per acre. It is, therefore, a plant of high fertilizing value when turned under, in spite of the fact that it has a very small root system.

Soja Beans and Horse Beans. These in point of nitrogen fall behind the crops already dissussed. They are, nevertheless, important as cover crops from the fact that they may be sown in drills and cultivation of the soil between the rows continued must later than if a broadcast-sown crop were used. They are also excellent snowholders.

The Importance of Moisture Control. We have come to realize in these later years that one of the most important problems in agriculture is the control, the regulation, of soil moisture. It is a large subject, and if discussed fully would involve the question of drainage—a matter of considerable interest to the orchardist,—the question of aeration of the soil, and several others. I purpose speaking of two phases only, phases that immediately touch upon our work under discussion—cover crops in the orchard.

All the soil-formed food that plants absorb must be in a state of solution before the crops can utilize it: the feeding rootlets can only appropriate, as it were, highly diluted food. In order then to obtain their food from the soil, crops require vast amounts of water. It has been estimated that at least 300 lbs. of water are taken up by the roots for every lb. of dry matter stored up in the stem, leaf or fruit. During the growing season we are to understand there is a constant stream of water passing through the tissues of the tree, parting with its dissolved material to build up, here and there, the various parts and organs of the tree, and finally transpired by the leaves and so returned to the atmosphere. In this way, probably more than 1,000 tons of water per acre each season are absorbed by the roots of a mature orchard, and this in addition to the water retained in the tissues of the tree and fruit, and that lost by capillarity and surface evaporation.

What is true of the tree is likewise true of the grass. To produce a crop of hay will require at least from 500 to 600 tons of water. Unless the season is one characterized by an abundant rainfall there are few soils that can support both grass and trees with all this moisture, and, as I have already said, it is the trees that suffer.

It is essential then that while the tree is making its growth and its fruit filling, there should be a sufficiency of soil moisture. This, as we have seen, is not likely to be the case if during that period a second crop—a surface feeder—is grown on the same area.

But it will not merely suffice in many districts to leave the trees the undisputed crop upon the soil during the growing season. In soil that is bare of foliage and left undisturbed, capillarity is set up and surface evaporation takes place. How can this be prevented? By occasional cultivation. The dry earth mulch so formed breaks up the capillarity tubes and thus arrests evaporation. It seems clear, then, that cultivation should be practiced during the spring and early summer. Is it essential or desirable that it should be continued throughout the season? I think not.

Some few years ago we determined during the autumn and winter the moisture content in the twigs of ten varieties of apples. These apples included some of the hardiest and some of the most susceptible to cold of the varieties that can be grown in the Ottawa district. Our results showed that the hardiest were those containing the least water. Indeed, the order of their moisture content was the order, or practically so, in which the Horticulturist, Mr. Macoun, had arranged the varieties according to observed hardiness. This goes to support the view that growing tissue contains more water than mature wood, that cessation of growth and early maturity of the wood may be induced by limiting the soil moisture supply, and that such mature wood is better able to withstand very low temperatures. It seems quite probable from the results of this investigation that the character of the autumn, both as to rainfall and temperature, may have very much to do in determining the immunity of the trees during the following winter.

Arguing from these premises, it is clear that to check the growth of the orchard trees in the autumn, abstraction of the soil moisture is very desirable. This can be accomplished through the growth of the cover crop sown in July.

For five years past we have conducted experiments in this matter of soil moisture control in the orchards of the Experimental Farm at Ottawa, and for two years past, similarly on the Experimental Farm at Nappan, N.S. The results and the conclusions therefrom are to be found more fully in the annual reports of the Chemical Division of the Experimental Farms. I need not now, therefore, enter into any detailed account of this work. A few of the more important data and deductions may suffice.

Let us consider first the case of an orchard in sod. In 1902, one of our series consisted of two adjoining plots, the one cultivated throughout the season; the other, in sod two years old. The soil was light and sandy. The rainfall throughout the summer was ample and well distributed. The samples of soil for moisure determination were taken every two weeks, beginning April 19th, and represented a depth of 14 inches. These two plots started out with practically the same moisture content, 15.5 per cent., but as the season advanced and the grass grew, the demand on the soil moisture in the sod plot became greater and greater. This became evident very soon after May 1st. By May 15th there was 50 per cent. more moisture in the first 14 inches of the cultivated plot. At the end of May this difference had increased to almost 100 per cent., or, in other words, there was nearly twice as much moisture in the cultivated soil. The percentages on May 31st were 17.3 and 9.8, respectively. This represents a difference of nearly 200 tons per acre. Throughout the whole growing season differences of a marked character and always in the same direction were to be observed. The data are of a most decisive nature, pointing to the heavy call on the moisture of the orchard soil by sod at a time when the trees are most in need of it. It was not until October 18th, the close of the season, when vegetative growth had ceased, and there was a liberal rainfall that the two plots approximated once more in their moisture content.

In 1903, a severe and unusual drought prevailed at Ottawa during the spring and early summer months. It affords an excellent opportunity to prosecute this research on the conservation of soil moisture. On May 23rd, on adjoining plots, the moisture in the cultivated soil was 12.65 per cent.; in the soil under sod, 4.78 per cent.—a difference equivalent to 180 tons of water per acre. The soil of the cultivated plot was quite moist to the touch, and the trees had not visibly suffered; the soil under the sod was a powder, apparently dry, and the leaves of the trees had begun to wither and fall. Enough has been said. It will not be necessary to follow the results in detail throughout the season till the drought broke. They emphasize the very exhaustive character of sod as regards soil moisture, and furnish proof of the immense value of cultivation in arresting the drying out of soils. Further, in another series we had that year, our data pointed out the desirability of early turning under the cover crop, and, if this is done by the plough, *immediately* working the soil with the cultivator in order to again set up capillary action with the underlying soil and creating an earth mulch to prevent surface evaporation.

We have referred to the growing of a grain crop in the orchard. Our experiments at Ottawa and Nappan show that this practice is to be condemned, for it makes an unusually large draft on the soil moisture at a time when the trees most require it. Trials were made with oats, winter rye and buckwheat. It will prove of interest to cite certain of the data we obtained. First, with regard to rye: During the first month of the investigation, May 9th to June 9th, the growing rye reduced the water content of the soil 5.89 per cent., equivalent to a loss of 150 tons of water per acre of 14 inches, over and above that lost on the adjoining cultivated plot—and this in spite of the fact that during that period there had been 2½ inches of rain. By the 23rd June, the percentage of moisture in the rye plot was still further reduced, though the cultivated plot maintained its initial percentage. This continued until a determination made about the middle of July showed but one-third the amount of water in the rye plot compared with that of the cultivated soil. The data of the oat and buckwheat plots are of a similar nature, though in certain particulars not quite so pronounced as those from the winter rye.

We also estimated the losses of soil moisture caused by growing a grain crop as compared with those resulting from the growth of the legume crops —clover and hairy vetch—and found in every instance that the soil bearing the grain crop suffered the greater loss. This is probably owing in a large measure not to greater transpiration, but to surface evaporation being more active in the grain covered soil; the soil carrying the clover and vetch is much shaded by their foliage, and thus evaporation is checked.

The effect of the various legume crops upon the soil moisture has been very fully studied. As it would be impossible now to recount all our experiments, I would present the following summary of the results obtained:

Soil moisture is retained by cultivation; is lost by growing a crop. This is true, of course, in spring, summer, and autumn, and consequently in this system we have a means of controlling the water supply of our orchard trees at all seasons during which it may affect their life or thrift.

The difference in the moisture content of soils from adjoining plots—the one under cultivation; the other, supporting a growing crop—is dependent upon several factors: in amount, it may vary from a few tons to more than 200 tons per acre, in the surface 14 inches of soil.

The larger the rainfall, the less difference in moisture content of these two plots, and vice versa. Cultivation is, therefore, all the more necessary with a restricted or limited rainfall.

The amount of transpiring surface or foliage materially affects the loss of soil moisture; the larger the crop, the more water it takes from the soil.

The character of the soil determines in some measure the extent of the loss. If capillarity is easily set up in the undisturbed soil, viz., that which is bearing a crop, water escapes by surface evaporation.

The shade afforded by a cover crop prevents in a degree surface evaporation.

Cutting the cover crop and using the material as a mulch, checks the loss of soil moisture. This allows in some districts and on certain soils growing the cover crop throughout the summer without unduly affecting the water supply of the trees.

REPORT ON RESULTS OF THE SEASON'S SHIPMENTS TO WINNIPEG FROM THE ST. CATHARINES COLD STORAGE COMPANY.

By Robt. Thompson, St. Catharines.

Early in the spring of this year several of the leading growers and members of the St. Catharines Cold Storage and Forwarding Company, Limited, met and agreed to co-operate and see if some arrangement could not be made and carried into effect whereby an opening could be secured for the disposal of our tender fruits in the Winnipeg and Western markets to supplement the efforts commenced in 1904 under Prof. Reynolds. It was realized that some sacrifices would have to be made the first season to enable us to secure a foothold and overcome some of the prejudices against Ontario fruits and Ontario packers, many of which were unfounded and were caused by dealers handling Western and American fruits.

Arrangements were at last made with the Ottawa Fruit and Produce Company of Winnipeg to handle our goods on commission and we agreed to ship the first car about the middle of August and ship every Tuesday and Friday, one car on each date, making two cars per week until the end of the season. The first car left on Friday, August 18th. Some twenty-five or more of our shippers by this time were anxious to join and ship some of their produce. A committee had been appointed to assist the directors of the Company in the management and handling of the details and it was felt that to refuse these shipments would cause hard feeling and possibly incur the ill-will of some, and as it was for the best interests of our other co-operative work that no cause for any disagreement should be given, no restrictions were placed as to the varieties of fruit and quantity of each to be placed in the cars by each individual shipper, provided he notified those in charge a reasonable time in advance of his intentions; neither were any restrictions placed as to the style of package and packing, provided it were honest. As a result all makes of baskets and variety of packages were brought to the cars and great difficulty was experienced in filling the cars snugly and safely. This was overcome after the first two cars by dividing the car into three compartments by first filling say one-third at each end with packages nearly alike and then putting up two solid partitions or bulkheads. After this little or no trouble arose from packages being damaged in transit.

Another serious difficulty confronted us by thus allowing every shipper to use his own judgment as to what he placed in each car. For instance, the first few cars contained from seven to eight hundred packages of tomatoes and only from four to five hundred of all other varieties of fruits. As a consequence tomatoes sold for little above cost of package, freight and commission. Later on some other variety of fruit would be overdone at times. When the first returns came in and those shippers who had placed tomatoes exclusively in the cars dropped out, we were confronted with the fact that unless something were done the shipments would have to be discontinued. Two cars had gone out light with only about eight tons of fruit in each, and you can readily see that freight on such would be very high. Two or three of the committee agreed that they would place all of their fruit going on commission in these cars, and if necessary buy enough to enable the cars to go forward as agreed. From this time to the end of the season no car went out light. It is true we had to place in these cars some baskets possibly not well filled, that we had to buy and at times we had to take baskets of pears and apples intended for other nearby markets and even pretty ripe tomatoes to make weight.

Just at this point I must digress for a moment to refer to the publication in not only our local papers, but in the leading Provincial and Dominion dailies of statements, purporting to be made by a Mr. Andrew Haynes, of Louth Township, who was sent out by the Department of Agriculture and accompanied one of the cars sent to another commission house in Winnipeg. In justice to our fruit-growers who shipped in these cars, I must most emphatically deny the truth of such misleading statements, as not a single barrel of apples was shipped from St. Catharines this season to the West in these cars. Not a single complaint of fruit being falsely packed in boxes or baskets was received from any buyer. I saw nineteen-twentieths of all the fruit placed in these cars, and examined the individual shipments frequently so as to be able to make notes on my copy of contents and shippers in the cars for future reference to see if we received more for better grades of fruit or better packages and packing, and also to judge of the ripeness of fruits shipped. I can truly say that in all the cars sent forward—twenty-eight in all—I did not find a single package dishonestly packed. I might also say that Mr. Carey or some other Inspector was present when over one-half of these cars were being loaded, and saw a portion of the contents of each and they can and will verify my statements. I think this speaks well for our shippers. I am sorry Mr. Haynes has not seen fit to have these statements corrected, and it will be only tardy justice if the papers that so readily copied and published the statements referred to would now publish the denial. We hope and trust that whenever any fruit-grower or Association of shippers is honestly trying to improve the packing and to overcome some of the difficulties arising from long distance shipments, that encouragement will be given to them in future by our officials and not have discredit thrown on them by classing all with some one dishonest packer out of hundreds of honest forwarders.

Early in the season the Dominion Government, through Mr. Moore, Chief of the Markets Division, placed thermographs in about one-half of the cars. These records are very interesting to study, and we feel from the results obtained that next season we shall ask that these be continued. Now for the results and conclusions we have come to, from the data received so far, (for there are still a few cars, detailed statements for which we have not received):—First, that it is not wise for any number of shippers, unless belonging to a co-operative association and having a storage in connection, to undertake to place cars in the West, as the kind of package to be used, the quantity of each variety of fruit to go in the car, must be named by the committee in charge, and there must be a sufficiency of fruit to fill each car on date of shipment. Few shippers are disposed to take the extra trouble in getting ready for long distance shipments. Packing in boxes or fancy packages without skilled and steady help is useless, as the results of our first efforts at box packing would show. The packing in boxes was kept up by two of our shippers and the results are very gratifying. Box pears, wrapped, which sold at first for from $1.35 to $1.60 per box, advanced steadily and sold later from $2.00 to $3.40 per box. You will see from the figures that I give later, that between 1,100 and 1,200 boxes were shipped to Winnipeg and of these over 1,000 were shipped by two of our growers. Only six men placed fruit in over one-half of the cars and these men are the most sanguine for the future.

A difficulty we encountered was to know just what degree of ripeness to have our fruit in. If the car should go forward and reach Winnipeg in five days or less and be placed on the market the next day, the fruit would probably be green, whereas if the car was delayed and took eight days in transit and not be sold for two or three days, the fruit would be spoiled if placed in the car even half ripe.

To summarize shipments: The first car left here on August 18th, the last on October 30th. Twenty-two cars were sent to the Ottawa Fruit and Produce Company, three to another wholesale house in Winnipeg, two sold to a firm in Calgary, and there was one car of vegetables. In these cars forty-two shippers placed fruit, but only six shippers had fruit in more than half of cars, twenty-five in four cars or less, and seventeen in over four.

Total Packages Shipped to the West.

3,300 baskets of tomatoes.
3,100 trays of tomatoes.
300 baskets of crab apples.
1,300 baskets of apples.
70 boxes of apples.
5,300 baskets of pears.
1,140 boxes of pears.
915 packages of peaches.
38,643 baskets of grapes.
610 packages of plums.
262 baskets of quinces.
8 boxes of quinces.
24 baskets of peppers.

The above fruit sold for $17,763, besides a car of vegetables.

I have given the darker side of the year's work, showing our difficulties and not our successes. I think this only right, as the first season there will be disappointments and we feel that we have learned many lessons that we will profit by, next season.

The men who stayed with the shipments throughout the season were unanimous in their conclusion that the price received was on the average equal to, if not greater than, the price in the Ontario and Quebec markets. They are prepared to go on next year and arrange with those who handle the fruit to supply so many carloads. We never sold so much fruit f.o.b. at St. Catharines as we did this year, and when the local market was glutted with grapes we were able to keep just that quantity out of the market here by shipping them to the West.

Mr. Andrew Haynes: As my name has been brought up in connection with the report just read, I desire to place the facts clearly before the Association, and have them fairly understood. When I was in the West my attention was drawn to a certain shipment from Ontario, which was a disgrace to those who made it, and I so expressed myself to the reporter that interviewed me. Unfortunately, when the report appeared in the press, it associated the shipment with growers in the St. Catharines district. Had I observed the report at the time, I would have taken steps to have had the facts clearly understood. My difficulty in publishing this explanation was that I should have been obliged to publish the names and the locality in question. I did not go to the West with the intention of inspecting fruit. I regret exceedingly that discredit should have been reflected on the St. Catharines growers through a misstatement in the press.

Mr. McNeill: I can corroborate Mr. Haynes' statement in so far as that I know he was there at the time a very bad shipment was made, and his statement corresponds with the report of our inspector that this shipment was a scandal and a shame to the fruit-growers who put it up. It did not come, however, from the St. Catharines section.

Q. Has there been a prosecution?

Mr. McNeill: Not as yet, but I can assure you that there will be one.

J. A. Ruddick, Chief of Transportation and Markets Branch, Ottawa: Mr. Thompson has given you some interesting information regarding the Winnipeg shipments of fruit. That brings up the question of long distance transportation of your fruit. In considering that, we must of course realize that when we undertake to ship fruit to Winnipeg, we have a somewhat difficult proposition before us. While a car of fruit may carry successfully for a twenty-four hour journey, it is an entirely different matter to have it carry successfully for four or five days. The first thing to consider is the car. There are a number of different styles of refrigerator cars, but they are all constructed on similar principles. There are, I consider, one or two essential points. First, the ice bunker should carry sufficient ice to keep the car cool between icing stations, and also to reduce the temperature in the car. Second, there must be provision for a proper circulation of air. The partition which forms the bunker at the end of the car should be open top and bottom and the car should be so constructed that it is not possible to pile the packages closely against these openings, so as to prevent circulation, which is often done. In some cases it is not possible to leave the opening unless you pile the fruit some distance away from the partition, which is likely to result in the packages shifting in transit. There should also be a grating of slats on the floor of the car so as to permit of ventilation and drainage. These slats should be flat—not rounded on the upper surface as is sometimes seen, as they do not provide a proper foundation for the packages, and light baskets especially are apt to break down under such conditions. Before loading a refrigerator car the drain pipes should be examined to see that they are not clogged. Our inspectors frequently find that in icing a car, the sawdust is not carefully removed and blocks up the drain-pipe, which results in the flooding of the bottom of the car.

I think these shipments prove conclusively that if you want fruit to remain cool as far as Winnipeg, it is necessary that it should be cool before it is placed in the car. It should be borne in mind that there is a great difference between a cold storage warehouse and a refrigerator car. If the fruit is placed in the car in a hot condition, the cooling capabilities are not sufficient to materially reduce its temperature, especially in view of the fact that the fruit itself is all the time generating a certain amount of heat. The car is at a further disadvantage owing to the fact that it must be loaded to its fullest capacity. If you were to fill a cold storage warehouse in the same way, no amount of refrigeration would cool off heated fruit in a reasonable time. There is always a reserve of space in the warehouse which tends to keep the temperature down. In shipping butter to Europe I find it necessary to chill it in a cold storage warehouse before it goes on board the steamer instead of taking it from the car to the vessel direct. The same principles apply there, as the steamer chamber is filled to its full capacity. There is this difference between fruit and dairy products that, with the latter there is no temporary increase of heat, whereas with fruit the amount of heat evolved in the process of ripening is perhaps greater than is generally supposed. In the case of the Winnipeg shipments the temperature outside the car was sometimes as high as eighty-five degrees, and at that temperature fruit ripens much faster than at sixty degrees. As a result of this we found that the recorded temperature of the first Winnipeg car which left on August the 18th was eighty-five degrees at the outset and that it fell gradually to seventy-one degrees, which is a very high temperature for carrying fruit for such a long distance. The other cars, which were despatched when the temperature was lower and where the fruit was cooled down to fifty-four degrees at the start, reached a point as low as forty-three degrees before arriving at Winnipeg.

A great deal has been said about the loading of cars. It should be remembered, especially in shipping fruit in baskets, that where you pack baskets to a height of six to eight feet in a car, there is, during a long journey, a very great strain on the lower tiers. One basket is a little weak, perhaps, and breaks down; the weight is then thrown on the others, and they all begin to go. Under such conditions, if the fruit has become a little ripe, the packages are more or less saturated with the juice and weakened on that account. I think it is desirable to put a packing of strips of half-inch wood between the packages in the lower tiers in order to distribute the weight. This packing should be placed over the tops of the baskets so that the baskets above rest on these strips. This system also promotes circulation of air through the fruit, and further, it stiffens the bulk of the packages and combines them together. This is a great advantage especially on a long journey, as it prevents the shifting which must otherwise occur with the continual swaying and jerking of the car back and forth.

My department had little to do with these shipments except that one of our inspectors was present when the car was shipped and also on its arrival at Winnipeg. Mr. Carey, also, accompanied one car to Winnipeg. We did, however, place thermographs in the cars so as to get a record of the temperature, and this is really the first time we have succeeded in getting good records. The thermograph case is stored away in the car with the fruit, the case being so constructed that a circulation of air is allowed through it. The Department has one hundred and thirty of these thermographs, and during the past season we had two hundred and seventy-seven records of temperatures in the holds and chambers of steamships carrying perishable products; so that we know in each case exactly what the temperature was from the start of the voyage to the finish. From these, blue-prints are afterwards made and copies are available for any interested shipper who has a cargo on that vessel. A thermograph is more rapidly affected by changes of temperature than the ordinary thermometer, and makes an accurate record of these changes. When the machine arrives at its destination, the chart is taken off and indicates the varying temperature during the trip. A thermograph is also a very good means of ascertaining where the delays occur, because, where the car is standing, the record is clear, but while the car is in motion, it is more or less blurred. We find from this record that some of the cars in these shipments were delayed twenty-two hours at one place. It shows where the delays occur and the duration of them.

I hope there will be considerable done in this Province in the way of erecting storage and packing houses for fruit. This is a matter to which I have given a great deal of attention as regards the construction of suitable buildings, and I shall be glad to place any information in my possession at the disposal of the fruit-growers. We have conducted experiments at Ottawa in reference to materials and combinations of materials for cold storage purposes. The most effective insulating material we have found, considering cost and everything else, is ordinary planing mill shavings.

Q. Could shavings be used for ice storage?

Mr. Ruddick: I have never used them for this purpose.

Q. Have you tested the qualities of various woods as regards insulation?

A. Spruce is ordinarily used because it has less odor than pine.

Q. I read that beech is the best wood to use for this purpose.

A. A great deal of unreliable information has been published on this subject as most of the work has been by companies who are interested in promoting a certain material for the purpose. We find that a twelve-inch space filled with shavings and double boards outside, will give just as satisfactory results as the same space with seven-ply lumber and a dead-air space between. It is better to fill the space with shavings than leave it as a dead-air space. The information that has been gathered on this subject will be published in the report of the Branch at the end of the year and we shall be prepared to give you the details of these experiments and any other information we have in regard to construction of this kind.

Mr. Bunting: I wish to record my appreciation of the effort put forward by the Department of Agriculture at Ottawa in order to assist us in making a success of the St. Catharines shipment. The primary reason in making these experimental shipments was the desire of the Railway Commission to ascertain the best type of refrigerator car for the transportation of fruit. The heads of the several divisions heartily co-operated with us in the work, and I feel that we are under a deep obligation to them for the assistance rendered. I think that these experiments are fraught with important results in connection with the opening up of the western market to our fruit. I believe we are on the verge of very great improvements in our transportation service. It has been felt for years that we have been laboring under excessive burdens in this respect. During the past year or two some relief has been afforded, and as the report states, the attention of those best calculated to give relief has been drawn to the necessity for improvement in reference to equipment, despatch, and the charges levied for the service rendered. I have every reason to believe that this Association will by a continuance of its efforts succeed in ameliorating these difficulties to a large extent, and if our fruit growers will profit by the results of the investigations which are being made in connection with the handling and packing of fruit, and supplement the efforts of the transportation company in this respect, I think our fruit industry will be placed on a much more satisfactory basis than ever before.

Mr. Ruddick: In reference to ice supplies for refrigerator cars, I took upon myself the other day to write to the Superintendent of the C. P. R., pointing out that the supply of ice at North Bay had not been adequate during the present season and that, in view of the fact that shipments in the West would probably increase in 1906, it would be necessary to put up an additional supply this winter. If any of the shippers have any complaints to make in regard to the shortage of ice at any point, I should be glad if they would acquaint me with them. We are paying the railway companies something like ten thousand dollars a year for the refrigerator car service and we are, therefore, able to approach them on such matters. I have no doubt they will be ready to adopt any suggestion that may be made.

Mr. Bunting: I should like to say that information received from a gentleman who accompanied a car to the Northwest is to the effect that the icing facilities at North Bay and west are very crude indeed, and that considerable delay frequently arose on that account. I think, therefore, it would be quite in order if Mr. Ruddick would investigate that matter, and suggest to the railway authorities that some improvement should be made.

Mr. Ruddick: I shall be glad to do that. Mr. Carey mentioned that fact in his report on the shipment.

Mr. Webster: I am glad that the report refers to the necessity of placing express companies in charge of the Railway Commission. It is a very important matter where I live. It was pointed out yesterday that people living in certain points in Northern Ontario could bring fruit from the United States and get it cheaper, after paying the duty, than they could bring it from Southern Ontario owing to the heavy express charges. This is not a proper state of affairs, and I think that continued pressure should be brought to bear on our representatives at Ottawa until the desired result is accomplished.

W. W. Moore, Extension of Markets Branch, Ottawa: In reference to transportation of fruit across the Atlantic, I should like to call the attention of the Association to the fact that this year thousands of dollars were lost to the fruit-growers and shippers through the bad condition in which apples have been landed in the Old Country. There was a shipment which left Montreal on October 6th by S.S. Bavarian, consisting of 28,000 barrels of apples, which was the largest single shipment that ever left that port. The vessel reached its destination at Liverpool on the 15th of that month. According to the report received from Montreal, the temperature of the sheds averaged 62 degrees, while the temperature of the barrels taken by the Inspectors ran from seventy degrees to eighty degrees. The Fruit Inspectors examined one hundred and five lots. Thirteen were reported to be in poor condition and twelve in a heated condition, this being equal to twenty-four per cent. that went aboard the vessel in bad shape. When the steamship arrived at Liverpool, our Inspector reported upon the condition of the shipment as follows:—"This cargo of apples was in poor condition. They had been heated. Many of the Snows, Colverts, Greenings, etc., were badly spotted and many of the 20 Oz. Blenheims, King-Pippins, etc., were bronzed or "scalded." Many were slack and a big percentage slightly wet and wet. Package good."

In the first four days sales by J. Adam, Son & Co. and Woodall & Company, 13,444 barrels were sold. Of this number 5,817 barrels, or forty-three per cent., were tight; 4,093 barrels, or thirty-one per cent., were slack; 1,495 barrels were slightly wet; 1,438 were wet; 416 were both slack and wet, and 140 were wasty or worthless. This makes a total of twenty-six per cent. that were more or less slack, wet and wasty. The prices received were in accordance with the above and were as follows:

Snows	Tight, 15/	Slack, 7/6	Slack and wet, 3/
Baxter	" 21/		" " 6/
Greening...	" 15/6		" " 6/
Baldwin ...	" 17/9		" " 5/6
King	" 21/6		" " 6/

The point I wish to make is that the analysis showed that twenty-four per cent. of the fruit went on board the steamer in bad condition and that twenty-six per cent. came out on the other side in bad condition. The best ventilation system that can be conceived of will not turn out apples in good condition when they go aboard heated or spoiled; so that it is up to the grower to see that the fruit is in good shape when it goes on board.

A MEMBER: With reference to this shipment it should be borne in mind that we had abnormally warm weather about the time the shipment was made, which was probably the reason for the high temperature of the fruit.

MR. TWEDDLE: Was there any provision made for the ventilation of the barrels? Our practice is to bore holes in the barrel with a view of keeping them cool. That has been our custom for the past two or three years when shipping in warm weather.

MR. MOORE: I think that is a good idea. I do not think there was any such provision in this case and as a matter of fact, we see very few barrels where provision is made for ventilation.

MR. LICK: Is there any effort made to provide heated cars for the winter transportation of fruit? I am informed by a gentleman in Maine that they have no difficulty in getting heated cars.

MR. RUDDICK: The C.P.R. undertake to supply heated cars for shipments out west. The heating is done with a coal-oil stove, that is to say, it is an ordinary refrigerator car with a lamp added. I think these cars could be procured down here. I cannot say how really efficient they are. Occasionally, I believe, a lamp goes out and causes some difficulty on that account.

MR. MCNEILL: These cars are not in sufficient number here in winter time to meet requirements, and I have known cases where through the explosion of the lamp the fruit has been much damaged by coal-oil smoke.

MR. MOORE: They use them largely in Nova Scotia, and on the whole they appear to give satisfaction.

A resolution adopting the report was then carried.

TRANSPORTATION AND MARKETS.

BY J. A. RUDDICK, DEPARTMENT OF AGRICULTURE, OTTAWA.

I do not appear before you this afternoon as an expert in fruit growing, but I have some interest in this great industry, especially where it touches the questions of transportation and marketing. With these subjects I have had a great deal to do for a number of years past. I have listened to the discussions here with a great deal of interest, particularly to the remarks on co-operation, because I believe there is a great future before that line of effort in connection with the fruit industry, and that it will do much to assist it, just as it has assisted the dairy industry. During a recent trip to Great Britain and Europe, I had an opportunity of looking into co-operation, especially in Denmark. In that country they have carried the work farther than in any country of the world to-day, and the results are most gratifying. In Denmark the work embraces the three great products of the country, butter, bacon, and eggs, and they have succeeded in producing enormous quantities of these commodities considering the area of the country, and put on the market a very excellent article. In this connection I may say that I was able a few months ago to publish a report on some phases of dairying in Denmark, and among them is included a description of the co-operative movement. If any of your members would care to secure a copy of this report, I shall be glad to send it to them. I should like to see it read by everyone who is interested in the work of co-operation, because there is no doubt that the Danes have been very successful in that line, owing largely to some of their native characteristics which perhaps we have not got to the same extent; but I believe that a study of the conditions of success there will be of use in this country.

I also listened with interest to Mr. Macoun's statements in regard to fruit growing in Ireland, and I agree with what he says as to the possibility of competition from that source. I spent three days with a fruit expert of the Department of Agriculture of Ireland, and I believe that if their plans materialize, they will prove important competitors. I am not prepared to say anything about the quality of their apples, because I do not know whether they have sufficiently proved that or not. I saw fine early dessert apples selling in Ireland last autumn at 14 S. a dozen. But for fruit of this kind there would of course be but a limited demand.

We have in dairy products very strong competition from this source. I was amazed at the quantity of butter produced there, the value of which reaches thirty million dollars annually.

While I was there I took occasion to visit some of the leading markets in Great Britain, just as did Mr. Sherrington. I visited some of the salerooms he speaks of and my conclusion was the same as his that it was difficult to understand with the noise and confusion which prevailed and the rapidity with which sales were made how business could be successfully conducted. Mr. Sherrington referred to the fact that Canadian products were not sold in those markets as Canadian. I was struck with that fact when visiting the retail establishments. I saw great quantities of Canadian produce but as a rule there was no mark upon it to indicate where it came from, with the exception of cheese and also of butter in some instances. There are, however, some difficulties in the way of indicating this, and so far as I could ascertain, it made no particular difference so long as the quality was right. I am not considering methods of selling or handling. The great mass of consumers in Great Britain do not care where the stuff comes from. With dairy products in particular, the difficulty exists that they come from so many different parts of the earth. On one day a man will be selling butter from Siberia, the next day from Ireland, and the next from Denmark, Canada or somewhere else, and it is impracticable for him to differentiate. I do not think there is much to be gained by trying to advertise, among the consumers, the country of origin of these products. The man who deals in the product is the one to get at.

As to selling our products to retailers, I am not sure that I would recommend that method, and believe that the plan of selling f.o.b. here would be more successful on the whole. I happened to be the means of sending the man to Canada that Mr. Johnston spoke of last night. I met Mr. Idiens in London, and he was then considering the advisability of sending his son over to purchase apples, and I gave him a letter of introduction to Mr. McNeill.

REPORT OF TRANSPORTATION COMMITTEE.

By W. H. Bunting, St. Catharines.

Gentlemen,—Your committee on Transportation begs to report as follows.

The past season has been one in which the volume of fruit more especially with reference to peaches and plums has been largely in excess of the year 1904. In fact with the single exception of apples, the same may be said of nearly all fruit grown in the Province of Ontario.

This has been the case to such an extent that it has at times taxed the ability of the railway companies to move all the perishable fruit that offered, more especially during the past two months. The situation became so critical at one time that your committee was forced to appeal to the Railway Commission, presenting the claims of the fruit growers and asking that provision be made for reasonably prompt handling of fruits which are of such perishable nature. We have reason to believe that this appeal was not without results.

There is still, however, a great lack of equipment suitable for the carriage of fruit on all the railways doing business in Canada. While the Refrigerator Car service is fairly good when the cars can be obtained, and an icing station is near the shipping point, it is often extremely difficult to secure these cars when required and considerable loss and disappointment has arisen during the past season from this very cause. Such a thing as a thoroughly efficient, ventilated car is not to be had outside of the refrigerator system which cars may be used for this purpose by fastening open the ice hatches.

A series of investigation has been instituted under the auspices of the Railway Commission for the past twelve months with the purpose of ascertaining what type of ventilated car is likely to be most suitable for this service and no doubt some recommendations will be made to the railway companies based on the results of these investigations. It is to be hoped that something may be granted in this respect before long.

Your committee is still of the opinion that a reduction in the rate of carriage of apples should be made, as the rate at present in force is considered excessive.

The express companies have had a very prosperous season as far as the fruit trade is concerned and it is felt by your committee that the time has come when a material reduction in express rates on fruit must be made. While the railway companies have to some extent recognized the justice of the claim of the fruit growers for a reduction in rate by freight service. the express companies have stood firmly to their guns, and continued in many instances to absorb by far the greater portion of the gross sales of large quantities of fruit. Your committee would urge this Association to bring all possible pressure to bear to have the express business brought under the control of the Railway Commission.

Your committee desire to state most emphatically that at no time in the history of the fruit trade of the Province have the railway authorities and officials taken a deeper interest in the question of the satisfactory transportation of fruit than during the past season. This fact augurs well for the prosperity of the trade in the future. We would urge upon the members of this Association to supplement by every available means the efforts of the railway companies to handle our shipments in a satisfactory manner.

APPENDIX "A."

PACKING HOUSES AND CO-OPERATION FOR FRUIT GROWERS.

By Prof. J. B. Reynolds, Ontario Agricultural College, Guelph.

Last year in connection with my investigations in cold storage, I superintended an experimental shipment of fruit from St. Catharines and Grimsby to Winnipeg. The report of this shipment has appeared in Bulletin 139. One of the principal conclusions from this experimental shipment is that in order to command the markets, and gain and hold the confidence of fruit dealers, and consumers, general co-operation among fruit growers is essential. First, in order that a continual supply of fruit in succession may be forwarded to the various markets in quantities and varieties such as the market may demand. A single grower is unable to fulfil this condition, but a community of growers shipping together will be able to supply, in succession and quantity, the varieties demanded. Secondly, for the purpose of packing. There are some Fruit Growers' Associations in Ontario who ship in co-operation and pack separately. The result of this packing is lack of uniformity in grading. Apart altogether from honesty of intention, no two men in different orchards can have exactly the same standard of excellence. As a consequence, fruit marked No. 1 from different orchards shipped in the same car will unavoidably vary both in size and in quality. This lack of uniformity is one of the most serious drawbacks in the Ontario fruit business, and I am satisfied that the only way to secure uniformity is to have all the fruit shipped by the Association packed in one place and under one management. Thirdly, for purpose of shipping and marketing, for the securing of cars, of obtaining favorable rates from the car companies; and for making a sufficient impression on the market. Further, co-operation in shipping will ultimately enable the growers to deal directly with the purchasers without the intervention of commission men. This will be accomplished when the purchaser can rely absolutely on the marking on the package. So long as the purchaser requires to examine his fruit before buying, fruit must be shipped to take its chances with the market, but so soon as the buyer may know that the mark on the package truly represents the quality of the goods contained therein, just so soon may the seller quote prices f.o.b., and thus dispense with sales on commission. For example, Mr. W. H. Owen, Manager of the Gypsum Fruit Co., Gypsum, Ohio, informs me that not only does he quote his own prices for the fruit shipped by his company, but the purchaser of that fruit, the wholesale dealer, resells it previous to the receipt of the goods. This manner of business implies absolute confidence in the quality of the goods,—confidence that goods marked No. 1 shall be No. 1 without exception, and that goods marked No. 2 shall be No. 2. When this feeling of confidence exists between shipper and purchaser, the goods shipped need not long take its chance on the market. I am convinced that the shipper will not be able to quote prices until this confidence is established through co-operative packing.

Co-operative packing in Ontario is making very satisfactory progress. Mr. A. E. Sherrington, of Walkerton, has been indefatigable in assisting to organize various associations in the different parts of the Province. Mr. Sherrington addressed meetings at a number of places where it was intended to organize associations, and by his experience and enthusiasm he succeeded in giving these enterprises in most places a good start. Among others, associations have been organized at Sparta, Clarkson, Burford, Ilderton, Thedford, Bloomfield, Oakville, Thornbury, Forest, Owen Sound, and Walkerton.

I have not a complete report as to what has been done at all of these places. At Oakville the association is in operation this year. A report of what is being done there appeared in the November number of *The Horticulturist*, and the Manager speaks with much gratification of the success of their business. At Forest last year thirty-eight cars of apples were shipped west. Perfect satisfaction was given, and one purchasing company stated that if they would pack under the same system this year, this company would handle their whole output. From Thornbury Mr. J. G. Mitchell writes that they have an excellent packing house with all the appointments up to date. The shipping part of the business, as well as the financial part, he reports in first-class working order. At Walkerton, under Mr. Sherrington's management, while only a small organization is there, last year fifteen cars were shipped,—one-half of which went west. Eight hundred barrels of apples were sent to Scotland. This year, owing to the scarcity of apples in that district, no business is being done by the Association.

Besides inquiring about the work in Ontario, I have visited a number of places in the neighboring states, where co-operation is being carried on. On the western side of Michigan there are several co-operative associations, handling, principally, peaches. Among these are Fennville, Bangor, and Benton Harbor, all of which I visited. At these places the fruit in all instances is brought to a central packing house, and is repacked under the eye of the manager. In some instances, fruit is sold f.o.b., prices being quoted according to the local ruling; in others the fruit is sold on commission. The best organized association that I visited on the other side is that at Gypsum, Ohio, under the management of Mr. W. H. Owen. This is a large association in the peach district, and peaches are the principal kind of fruit handled. The first year of the management, I think in 1900, 105,000 bushels of fruit were handled at the packing house in ninety days. Last year, 1904, 45,000 were handled. The day that I visited the packing house, the 5th September, eight cars of peaches were shipped out. The packing house with a full complement of labor can handle 5,000 bushels per day. This packing house is about 150 feet in length and 50 feet in width. Along the full length of the house runs the delivery floor. The packing floor is three feet lower than the delivery floor, and at the breast just below the delivery floor stand machine graders, which are used exclusively in grading the large fruits, such as pears, peaches, and apples. The peaches are graded by the machine into four grades, according to size, and at each basket which receives the different grades from the machine, an attendant stands to remove any unsound or imperfect samples which are not up to the required quality. The peaches are shipped mostly in bushel baskets, but partly in half bushel and quarter bushel baskets. The prices are quoted to the dealers and the fruit sold mainly to wholesale dealers in Boston, Philadelphia, Pittsburg, Cincinnati, and other large cities. When orders have not been received for the next day's packing, the manager usually sends out wires to his different customers stating the prices that will be ruling the next day on the different grades of fruit, and in this way he avoids the necessity of shipping on commission.

I append herewith extracts from the by-laws and business forms of the Gypsum (Ohio) Co-operative Association:

Objects. The object of this organization is for the sale of the fruits grown by its members, also to buy and sell such fruits during the season as opportunity presents.

Executive Committee. The directors may select not to exceed three of their number to act as an executive committee, (the President to serve as chairman of this executive committee) to have general charge of the affairs of the corporation during the fruit season. This committee shall order all purchases of supplies. The directors shall regulate the amount of compensation this committee shall receive.

Membership. Any fruit grower in district specified, shall be eligible to become a member by a two-thirds vote of the stockholders of record at the time the application is made, also a two-thirds vote of members shall determine the value of each share of the stock that such party shall pay into the treasury, if he or she shall be admitted as a member.

Meeting of Executive Committee. The executive committee, during the fruit season of each year, shall meet at least once a week, or oftener if the interests of the company shall demand it.

Fruit Delivered. All peaches, pears, plums, and quinces grown by each and every member of this company shall be delivered to the company's packing-house for grading, packing and shipment.

Grapes and other small fruits may be delivered to the company for sale or disposal, and shall be disposed of for the grower on a commission of one cent per basket.

Condition of Fruit. Each and every member shall pick his fruit in prime condition and deliver same promptly to the company's packing-house. In case green and immature fruit or overripe fruit, or windfalls be delivered by any member, same may be accepted and said member shall be credited with average price such fruit may bring.

Penalties. Each and every member shall have the right to give away such fruit of his own raising as he or she may elect; but shall not seek, solicit and make sales of fruit outside of the company, excepting windfalls and cull grades or any fruit that may not be accepted by the company. Any member so doing shall pay into the company's treasury the sum of fifty cents per bushel for all such fruits sold, excepting sales of aforesaid grades.

Credits and Expenses. All fruit delivered each day shall be credited to the person furnishing the same at the average price which fruit brought that day.

One-third of the amount so credited may be retained by the company until the close of the season for final settlement, and from the aggregate of the amounts so retained from each member there shall be at the end of the season, before paying the same over to the respective members of the company, be deducted all expenses and losses. All expenses of handling, packing and marketing fruit shall be borne by the several members of the company in proportion to the number of bushels of fruit with which each has been credited. All losses and rebates shall be deducted in proportion to the money credit of each member.

Following are forms of receipt and credit that are made out for each lot of fruit brought to the packing house:

Date, 1905.
Received from ....
.... Bushels Yellow Peaches, ungraded.
.... Bushels White Peaches, ungraded.
Other Fruits ....

....
No. .... Receiving Clerk.

Grade.	Carriers.	1.	½.	¼.	Total in bushels.	Price.	Amount.
AA Yel							
White							
A Yel							
White							
B Yel							
White							
C							
Total of peaches							
Culls.							
Other fruit							
Grader No.				Total credit .... $			

Summary.

............190

PEACHES.

Total bushels.	Av. per bus.		Total.	
	$	c.	$	c.
AA				
A				
B				
C				
Total bus. peaches ...	Total amount			

Total average peaches (all grades)
........per bushel

OTHER FRUITS.

Total bushels.	Av. per bus.		Total.	
	$	c.	$	c.
Plums.......				
Pears........				
W. F........				
Culls.				
Total bus all fruits exclusive of culls.				

Total credits all fruits .....$

To balance Cr.

Date.	Items charged.	Amount.
Total debits		

THE FOREST FRUIT-GROWERS AND FORWARDING ASSOCIATION.

This association was organized and commenced business in 1904 with seventy-five members. This year, 1905, the membership has been reduced to thirty, principally by the operation of a by-law requiring all members of the association to spray their orchards four times during the season. The secretary reports a good crop of clean fruit among the members of the association, while generally in that district the crop is inferior. Last year most of their fruit was sold to Winnipeg and Brandon dealers, and with such good satisfaction that the same dealers wished to buy all the output this year and orders were received from the west for 25 or 30 carloads. Being anxious, however, to establish a British trade, the association this year sold the bulk of their fruit to an English buyer. Practically all the fruit thus far has been sold at the packing house.

The association have not as yet built a packing house, but have rented a large curling rink in Forest. The ungraded fruit is delivered at one end of the large floor space, the grading and packing done at the middle, and the packed fruit stored at the other end. There are, as yet, no cold storage facilities here, nor have these been needed by the class of apples so far handled.

The district of Forest is situated within five miles of Lake Huron, and is thus favorably placed for fruit growing. In fact in its climatic features it is very similar to the Annapolis Valley in Nova Scotia. The President, Mr. Daniel Johnson, has an orchard of 30 acres bordering on the shore of the lake.

Both the president of the association and the secretary, Mr. Andrew Lawrie, when I visited them, felt highly gratified with the success so far achieved, and especially with the very prompt recognition, by the buyers, of the superior quality and uniformity of their goods. They hope to have a cold storage, and possibly a packing house of their own, in the near future; although they think so far as a packing house is concerned, what is required is a building of requisite shape—oblong; plenty of floor space for working and storing; a place for storing packages; and nearness to the railway track. Most of these requisites they find in the building at present used, and as the rent is reasonable, they are in no hurry to build.

The Georgian Bay Fruit-Growers' Limited.

The fruit-growers in that part of the Georgian Bay district surrounding Thornbury have organized a company for the purpose of packing and disposing of the fruit grown in that district. This company has a feature that is somewhat unique in farmers' co-operative concerns; it has been organized into a joint stock company, with a Provincial Charter authorized to pack, buy and sell fruit, and to erect packing houses and storage houses. The shares of the company are held at twenty-five dollars each, and thus far there are about one hundred and thirty shareholders in the company. A building has been erected this fall, and already about seven hundred barrels of apples have been packed and shipped to Liverpool. About three hundred barrels were held in the packing house, and it is the intention of the company to keep this fruit, consisting entirely of winter varieties, until late in the winter.

The packing house was commenced about the first of August and by the first of December was practically completed. It is a building 100 feet in length and 40 feet in width, consisting of a basement 9 feet high and a storage and packing house 13 feet high, and above this a garret. The basement, as well as the storage house above are intended for winter storage. These two together have a capacity of about 5,000 barrels. The ground floor is divided into two parts, one part about 25 x 40, consisting of the packing house proper; the other part about 75 x 40, consisting of the storage house.

The garret above when used will contain empty packages. The walls are constructed of concrete ten inches thick, and from the ground floor up to the first floor, the wall is insulated by four inches of planer shavings, held in place by inch lumber tongued and grooved. The whole building is well lighted, and the windows of the storage house have been provided with double sash and close fitting wooden shutters, so that it is hoped the temperature can be kept above freezing point. For ventilation, two large flues, one near each end of the building, have been provided, running from the basement ceiling to the garret, and extending some six feet above the garret floor. As these flues pass through the storage chamber, slides are provided which may be opened or shut as desired for change of air in the storage chamber. When the windows in the basement are opened, a strong current of air passes up these flues and effects a rapid change of air and affords a means for controlling the temperature of these chambers.

The building is situated close to the freight sheds of the railway at Thornbury, these two buildings being connected by a platform. Fruit may be delivered at one side of the building, packed and passed through to the platform on the other side, and loaded immediately on the cars: or, if it is to be held, it may be run into the storage room or carried to the basement.

A number of the members of this Joint Stock Company have purchased a small cooper shop in the town and have manufactured their own barrels this season, at a cost of twenty-seven cents per barrel. It is the intention to place the manufacturing of barrels under the control of the company.

Thus far fruit has been consigned to commission agents in Liverpool, but the company will likely in the near future sell direct to dealers. A commendable feature of their business transactions is the arrangement whereby their members may be advanced part of the value of the fruit stored in the building. It was felt that there would be difficulty in inducing all the members concerned to hold the fruit until a later and more favorable opportunity for selling. Accordingly, arrangements have been made with the bank for advancing to the owners of the fruit one dollar per barrel.

Mr. J. G. Mitchell, the energetic manager of this company, is very hopeful regarding the outcome of this experiment. He claims that the joint stock company feature has two advantages over the mere co-operative association; first, the members have a financial interest in the success of the concern apart from the mere picking and selling of their own fruit. This constitutes a bond of union, and it is claimed members are less likely to withdraw from membership or to sell their fruit elsewhere. Secondly, by the selling of shares, money is provided for capital expenditures, such as the erection of packing houses, storage houses, and cooper shops. The company expect next year to erect an ice cold storage to aid them in handling their summer and early fall fruits, the present insulation storage being adapted only for winter storage.

COLD STORAGE AND CO-OPERATION.

In my inquiries on the subject of packing houses, I do not find much attention given to cold storage as a factor of the business, that is to say, buildings constructed for the purpose of cooling the fruit by means of ice or some other refrigerant. There are storage houses, such as the one at Thornbury, intended for winter storage. But in most of these districts, if not in all, there must be a considerable quantity of summer and early autumn fruits which are very perishable and which seem to require some cold storage facilities to complete the arrangements. At these places there are at least plums and pears and early apples to be handled. In the Niagara and Lake Erie districts there are other tender fruits, such as grapes and peaches. Unless these can be packed, loaded, and shipped within a few hours after picking, some arrangement for cold storage seems to be advisable. Most of the co-operative associations realize this and intend in the near future to construct a cold storage of some kind. At St. Catharines a first rate cold storage of the mechanical pattern has been in operation for some years. Mechanical refrigeration, however, is not generally advisable, since it is very expensive in the first cost and expensive in operation as compared with ice. Where ice storage will give a desired temperature, the latter is to be preferred. It is not necessary here to go into details by way of recommending any particular plan for cold storage. I may say, however, that I have given considerable attention to this question, and shall be glad to assist co-operative associations in the preparation of plans to suit their special purposes.

In the above report I have dealt more particularly with the co-operative associations that have been more recently established. There are other associations in Ontario that have been established for some time and that have been during that time sufficiently before the public not to require any detailed account here. Of these associations, I might mention the Burlington Fruit Growers' Association and the St. Catharines Cold Storage and Forwarding Company. Both these companies have been organized for some time, and, while so far as I know they have not attempted any packing in co-operation, they have co-operated for the purpose of marketing their fruit. The Burlington Fruit Growers have been selling their fruit as an association for some years. This year the St. Catharines Association have followed up the experimental shipment made last year from St. Catharines and Grimsby, and have shipped a large quantity of fruit in carload lots by freight to Winnipeg. A report of these shipments was given at the Fruit Growers' Convention recently held in Toronto.

After looking over the whole field in its varied aspects, including packing, storing, and marketing, it seems to me that in order to command the situation to the best advantage either a co-operative association or a joint stock company is necessary, and also a packing house of suitable arrangements and dimensions, and situated at the railroad, is highly advisable if not absolutely necessary. As to the construction of the packing house, when I commenced my inquiries, I was inclined to think that a specially constructed house would be desirable. Now, however, I am inclined to recommend that no special features are necessary in packing houses, so far as internal arrangements are concerned. It should be long and relatively narrow, so that the ungraded fruit may be unloaded at one end, the grading may be done at the centre, and the graded fruit at the other end be adjacent to the railway platform. Beyond that, so far as packing houses are concerned, there are no special features.

Next, as to storage houses, it seems that winter fruit should generally be held by the owners if the best ultimate results are to be reached. If green stuff is put on the market, it makes an unfavorable impression and the grower or packer should be the best judge of the fitness of fruit for the market. At the packing house, therefore, I advise that the fruit should be held until it is ready for use. In order to do this winter storage will be necessary, that is to say, a building or part of a building with well insulated walls provided with ventilation. I think that the construction of the building I described above, belonging to the Georgian Bay Fruit Growers', is one to be recommended.

APPENDIX "B."

By-laws of the ——— Fruit Growers, Limited. Incorporated under the Act to provide for the Incorporation of Cold Storage Associations of the Province of Ontario.

1. This Association of fruit growers shall be known as the
Fruit Growers, Limited.

2. The purpose of this organization is for the packing and selling of the fruit grown by its members, also buying and selling such other fruit during the season as opportunity presents itself.

3. The capital stock of the company shall be in shares of the sum of ten dollars. No member shall hold more than twenty shares.

4. The annual meeting of the Company shall be held on the first Thursday in May in each year.

5. Special meetings of the stockholders may be held at any time upon call of the President by written notice mailed to each stockholder five days before the meeting. Special meetings shall also be called by the President whenever required to do so in writing by one-tenth part in value of the shareholders of the company.

6. At any meeting of the Company, a one-half representation of the stock either in person or by written proxy shall constitute a quorum for the transaction of business.

7. At the annual meeting of the Company, five Directors shall be elected of whom three shall constitute a quorum at any board meeting.

8. The officers of the Company shall consist of a President, Vice-President, Secretary-Treasurer, Manager and two Auditors.

9. The President and Vice-President shall be chosen by the directors from among themselves at the first board meeting after the annual meeting. The other officers shall also be chosen at this time, but not necessarily from among the Directors.

10. All elections of the company shall be by ballot, plurality electing, conducted by two scrutineers appointed by the chairman. Each shareholder shall be entitled to as may votes as he owns shares in the Company.

11. The President shall preside at all meetings of the Company. He shall call meetings of the board of Directors and shareholders when necessary and shall advise with and render such assistance to the Manager as may be in his power. In his absence, the Vice-President shall have and exercise all rights and powers of the President.

12. The Secretary-Treasurer shall keep a record of the proceedings of all meetings and of all the receipts and disbursements, and report the conditions of the finances annually or as often as the Directors shall desire.

13. The Manager shall have charge of the business of the Company in detail under the supervision of the President.

14. The Manager and Secretary-Treasurer shall give bonds in such sums as shall be acceptable to the Company.

15. The Directors may select three of their number to act as an Executive Committee (the President to serve as chairman) to have general charge of the affairs of the corporation during the fruit season.

16. When a vacancy shall occur through any cause in any of the offices established by the by-laws of the Company, it shall be filled at the next regular or special meeting of the Company.

17. Any fruit grower in County or Township shall be eligible to become a member by a two-thirds vote of the stockholders at the time application is made.

18. Any member of this Company may withdraw at any time between January 1st and April 1st. Such notice of withdrawal must be given in writing to the President or Director of the Company.

19. All apples grown by the members of the company shall be delivered to the Company's packing house in prime condition for grading, packing and shipping. Other fruits may be delivered to the Company for sale on commission.

20. The books of the Company shall be audited before the date of the annual meeting each year. At this meeting a printed statement of the receipts and expenditures as audited shall be presented to each stockholder.

21. These by-laws may be amended at any regular or special meeting by a vote of the stockholders or stock present in the affirmative. Notice of such amendments must be given each shareholder by letter or otherwise at least five days previous to the meeting.

APPENDIX "C."

FRUIT PRIZE LIST.

HORTICULTURAL EXHIBITION, TORONTO, NOV. 13-18, 1905.

APPLES. CLASS I.—EXPORT OR FOREIGN MARKET VARIETIES.

Barrels Ready for Shipment.

Baldwin. 1st, Biggs F. & P. Co. 2nd, E. Lick. 3rd, Chatham Fruit Growers' Association.
Ben Davis. 1st, Chatham F. G. A. 2nd, F. S. Wallbridge.
Greening. 1st, E. Lick. 2nd, Biggs F. & P. Co. 3rd, Chatham F. G. A.
King. 1st, E. Lick. 2nd, Biggs F. & P. Cc. 3rd, Chatham F. G. A.
Russets. 1st, The Forest Fruit Growers' Association. 2nd, Chatham F. G. A. 3rd E. Lick.
Spy. 1st, C. W. Challand. 2nd, Biggs F. & P. Co. 3rd, Forest F. G. A.

Boxes Ready for Shipment (Fruit Unwrapped).

Baldwin. 1st, C. W. Challand. 2nd, E. Lick. 3rd, Chatham F. G. A.
Fameuse. 1st, J. B. Gutthrey. 2nd, A. D. Harkness. 3rd, H. Jones.
Greening. 1st, Biggs F. & P. Co. 2nd, E. Lick. 3rd, Chatham F. G. A.
King. 1st, E. Lick. 2nd, J. B. Gutthrey. 3rd, Biggs F. & P. Co.
McIntosh. 1st. A. D. Harkness.
Russet. 1st. Biggs F. & P. Co. 2nd, E. Lick. 3rd, J. B. Gutthrey.
Spy. 1st, C. W. Challand. 2nd. Biggs F. & P. Co. 3rd, N. Brown.

Boxes Ready for Shipment (Fruit Wrapped).

Fameuse. 1st. J B. Gutthrey. 2nd, H. Jones. 3rd, A. D. Harkness.
Gravenstein. 1st. E. Lick.
King. 1st, E. Lick. 2nd. J. B. Gutthrey. 3rd. Biggs F. & P. Co.
McIntosh. 1st. A. D. Harkness.
Scarlet Pippin. 1st, H. Jones.
Spy. 1st. Biggs F. & P. Co. 2nd, J. C. Harris. 3rd, R. Thompson.
Wealthy. 1st, J. B. Gutthrey.

Class 2—Domestic or Home Market Varieties not Included in Class One, Barrels Ready for Market.

Gravenstein. 1st, E. Lick.
Any Other Variety. 1st, E. Lick. 2nd, J. B. Gutthrey.

Boxes Ready for Market.

Alexander. 1st, E. Lick.
Blenheim. 1st, J. B. Gutthrey. 2nd, A. R. Davison. 3rd Biggs F. & P. Co.
Gravenstein. 1st, E. Lick.
Any other Variety. 1st, E. Lick. 2nd, W. H. French. 3rd, C. L. Stephens.

Class 3.

Any Three Varieties, Fall or Early Winter, Dessert. 1st, Biggs F. & P. Co. 2nd. W. C. Reid. 3rd, A. D. Harkness.

Any Three Varieties, Late Winter Dessert. 1st, C. W. Challand. 2nd, Forest F. G. A. 3rd. J. B. Gutthrey.

Any New Variety, Dessert. 1st, J. B. Gutthrey. 2nd, C. L. Stephens.

Any Three Varieties, Fall or Early Winter, Cooking. 1st, J. B. Gutthrey. 2nd, A. R. Davison. 3rd, C. L. Stephens.

Any Three Varieties, Late Winter, Cooking. 1st, N. Brown. 2nd, Forest F. G. A. 3rd Biggs F. & P. Co.

Any New Variety, Cooking. 1st, W. M. Robson. 2nd. J. B. Gutthrey. 3rd, C. L. Stephens.

Class 5.

Collection, Six Varieties, Winter. 1st, C. W. Challand. 2nd, J. B. Gutthrey. 3rd. Forest F. G. A.

Class 6—Pyramids of Fruit.

Ben Davis. 1st. Chatham F. G. A. 2nd. J. L. Hilborn.
Baldwin. 1st, E. Lick. 2nd, J. B. Gutthrey. 3rd, Chatham F. G. A.
Gravenstein. 1st, E. Lick.
Fameuse. 1st J. B. Gutthrey. 2nd, A. D. Harkness. 3rd, H. Jones.
King. 1st, J. B. Gutthrey. 2nd. E. Lick. 3rd, Chatham F. G. A.
Spy. 1st, J. B. Gutthrey. 2nd, Biggs F. & P. Co. 3rd, A. R. Davison.
Scarlet Pippin. 1st, H. Jones.

PEARS.

Class 8—Any Three Varieties Correctly Named.

1st C. E. Secord. 2nd, R. Thompson. 3rd, Biggs F. & P. Co. 4th, F. G. Stewart. 5th, W. H. Bunting.

Export Varieties, Half Cases Ready for Shipment (Fruit Wrapped).

Anjou. 1st, R. Thompson. 2nd, F. G. Stewart. 3rd, C. E. Secord.
Bosc. 1st, F. G. Stewart. 2nd, C. E. Secord. 3rd, R. Thompson.
Clairgeau. 1st, Biggs F. & P. Co. 2nd, F. G. Stewart. 3rd, R. Thompson.
Duchess. 1st, F. G. Stewart. 2nd, C. E. Secord. 3rd, W. H. Bunting.
Kieffer. 1st, F. G. Stewart. 2nd, C. E. Secord. 3rd, W. H. Bunting.
Lawrence. 1st, F. G. Stewart. 2nd, C. E Secord. 3rd, R. Thompson.

Class 10—Domestic Varieties, 11 qt. Baskets, Ready for Market.

Winter Nelis. 1st, R. Thompson. 2nd, F. G. Stewart. 3rd, C. E. Secord.
Any other Variety. 1st, R. Thompson. 2nd, W. H. Bunting. 3rd, N. Brown.

GRAPES.

Class 11—For the Best Six Bunches Correctly Named of each of the Following Varieties.

Agawam. 1st, R. Thompson. 2nd. F. Sinnett. 3rd. F. G. Stewart.
Concord. 1st, F. Sinnett. 2nd, W. H. Bunting. 3rd, F. G. Stewart.
Lindley. 1st, F. G. Stewart. 2nd, R. Thompson. 3rd, W. M. Robson.
Niagara. 1st, F. G. Stewart. 2nd, W. H. Bunting. 3rd, F. Sinnett.
Vergennes. 1st, F. G. Stewart. 2nd, R. Thompson. 3rd, C. E. Secord.

Wilder. 1st, R. Thompson. 2nd, F. G. Stewart.

Black, 9 lb. Basket. 1st, R. Thompson. 2nd, F. G. Stewart. 3rd, F. Sinnett.

Red, 9 lb. Basket. 1st, F. G. Stewart. 2nd, R. Thompson. 3rd, W. H. Bunting.

White, 9 lb. Basket. 1st, W. H. Bunting. 2nd, R. Sinnett. 3rd, F. G. Stewart.

Black Grapes, Crate. 1st, W. H. Bunting. 2nd, R. Thompson. 3rd, C. E. Woolverton.

Red Grapes, Crate. 1st, W. H. Bunting. 2nd, R. Thompson. 3rd, F. G. Stewart.

White Grapes, Crate. 1st, W. H. Bunting. 2nd, R. Thompson. 3rd, F. G. Stewart.

Collection of Hot-house Grapes. 1st, John Chambers.

Hot-house Grapes, Two Bunches, White. 1st, John Chambers.

Hot-house Grapes, Two Bunches, Black. 1st, John Chambers.

Class 12—Collection by Association or Society. 1st, St. Catharines Cold Storage Co. 2nd, Norfolk Union Fair. 3rd, Chatham Fruit Growers' Association. 4th, Orillia Horticultural Society. 5th, Leamington Horticultural Society.

PRESERVED FRUIT.

Class 13—One Quart Sealer of Canned Fruit of Each of the Following Varieties.

Cherries, Black. 1st, Mrs. A. M. Smith. 2nd, Mrs. R. Thompson.

Cherries, Red. 1st, Selkirk Women's Institute. 2nd, Miss Douglas. 3rd, Mrs. Emory.

Cherries, White. 1st, Mrs. A. E. Sherrington. 2nd, Mrs. H. Thompson. 3rd, Miss Douglas.

Gooseberries. 1st, Mrs. L. A. Brown. 2nd, Mrs. Hutt. 3rd, Mrs. Thompson.

Grapes, Red. 1st. Mrs. Thompson. 2nd, Mrs. Smith

Grapes, White. 1st, Mrs. Thompson. 2nd, Mrs. Hutt.

Grapes, Black. 1st, Mrs. Thompson.

Peaches, White. 1st, Mrs. Shuttleworth.

Peaches, Yellow. 1st, Mrs. Bunting. 2nd Mrs. Sherrington. 3rd, Mrs. Hutt.

Pears. 1st, Miss Douglas. 2nd, Mrs. Hutt. 3rd, Mrs. Smith.

Plums, Red. 1st, Selkirk Women's Inst. 2nd, Miss Douglas. 3rd, Mrs. French.

Plums, Yellow. 1st, Mrs. French. 2nd, Selkirk Women's Inst. 3rd, Mrs. Hutt.

Raspberries, Red 1st. Mrs. Thompson. 2nd, Mrs. Hutt. 3rd, Mrs. Emory.

Raspberries, Black. 1st, Mrs. Thompson. 2nd, Mrs. T. Hammond. 3rd, Mrs. Shuttleworth.

Strawberries. 1st. Mrs. French. 2nd, Mrs. F. G. Stewart. 3rd, Mrs. Smith.

Class 14.

One Pint Sealer of Jam of Each of the Following Varieties.

Black Currant. 1st, Mrs. A. N. Broddy. 2nd, Mrs. Shuttleworth. 3rd, Mrs. L. Woolverton.

Peach. 1st. Mrs. Thompson. 2nd, Mrs. Hutt. 3rd, Mrs. C. E. Woolverton.

Pear. 1st Mrs. Thompson. 2nd. Mrs. Hutt. 3rd. Mrs. C. E. Woolverton.

Plum. 1st. Mrs. C. E. Woolverton. 2nd, Mrs. Emory. 3rd, Mrs. Thompson.

Raspberry. 1st, Mrs. Shuttleworth. 2nd, Mrs. Broddy. 3rd, Mrs. Hutt.

Strawberry. 1st, Mrs. Stewart. 2nd, Mrs. Woolverton. 3rd, Mrs. Thompson.

Class 15.

One Half-pint Jar of Jelly of Each of the Following Varieties.

Apples. 1st, Mrs. Hutt. 2nd, Selkirk Women's Inst. 3rd, Mrs. C. E. Woolverton.

Crab Apple. 1st. Mrs. Hutt. 2nd. Mrs. Thompson. 3rd, Mrs. Bunting.

Red Currant. 1st, Mrs. Hutt. 2nd, Mrs. L. A. Brown. 3rd, Mrs. Thompson.

Grape. 1st, Mrs. Hutt. 2nd, Mrs. C. E. Woolverton. 3rd, Mrs. Thompson.

Quince. 1st, Mrs. C. E. Woolverton. 2nd, Mrs. J. L. Hilborn. 3rd, Mrs. Bunting.

Class 16.

Grape Juice. 1st, Mrs. Bunting. 2nd, Mrs. Stewart. 3rd, Mrs. Thompson.

Class I—Special.

Cherries, Peaches and Strawberries. 1st, Mohawk Women's Inst. 2nd, Selkirk Women's Inst. 3rd, Burlington Women's Inst.

Pears, Plums and Raspberries. 1st, Burlington Women's Inst. 2nd, Mohawk Women's Inst. 3rd, East Elgin Women's Inst.

Apples, Best Collection. 1st, Selkirk Women's Inst. 2nd, Mohawk Women's Inst.

COUNTY EXHIBITS.

Class 17—Hastings.

Export Varieties. 1st, Lewis Miles. 2nd, W. C. Reid.
Domestic Varieties. 1st, W. C. Reid. 2nd, L. Miles.

Class 18—Bruce.

Export Varieties. 1st, W. A. Rowand.

Class 19—Kent.

Export Varieties. 1st, C. J. Ross. 2nd, Chatham F. G. A.
Domestic Varieties. 1st, Chatham F. G. A. 2nd, C. J. Ross.

Oxford.

Export Varieties. 1st, J. C. Harris.
Domestic Varieties. 1st, J. C. Harris.

Lambton.

Export Varieties. 1st, J. Atkin. 2nd, Forest F. G. A.
Domestic Varieties. 1st, J. Atkin.

Lincoln.

Export Varieties. 1st, C. E. Secord.
Domestic Varieties. 1st, C. E. Secord.

Class 20—Leeds & Grenville.

Alexander. 1st Wm. Beddie. 2nd, J. Warner.
Baxter. 1st, Ed. Keeler. 2nd, J. Warner.
Canada Red. 1st, J. Warner. 2nd, Wm. Beddie.
Fameuse. 1st, J. Warner. 2nd, Wm. Beddie.
McIntosh Red. 1st, Wm. Beddie. 2nd, H. Jones.
Golden Russet. 1st, Wm. Beddie. 2nd, H. Jones.
Scarlet Pippin. 1st, Wm. Beddie. 2nd, J. Warner.
Scott's Winter. 1st, Wm. Beddie. 2nd, H. Jones.
Wealthy. 2nd, Ed. Keeler.
Any other Variety. 1st, Ed. Keeler. 2nd, H. Jones.

Class 21—East Simcoe.

Section I. 1st, C. L. Stephens.
Section II. 1st, C. L. Stephens.
Section III. C. L. Stephens.
Section V. C. L. Stephens.

Class 22—Ontario.

Export Varieties. 1st, W. H. Stevenson. 2nd, E. Lick.
Domestic Varieties. 1st, E. Lick. 2nd, W. H. Stevenson.

APPENDIX "D."

DIRECTORS' REPORTS FOR SEASON OF 1905.

1. *What fruits were injured last winter, and to what extent?*

In the eastern counties, reports state that no injury worth noting was done. Cherry buds as is expected, suffered, and the buds of European and Japan plums. These fruits are considered tender there. Trees injured during the winter of 1903-4 are still dying off in considerable numbers.

In the central, western and northern counties, the reports are also favorable. Mention is made of continued evidence of the severe winter of 1903-4. Respberries and strawberries suffered in a few cases, and in the Guelph section, pears, plums and cherries are reported as damaged to the extent of twenty-five per cent. Peach buds suffered at Leamington.

2. *How much planting was done in your district, and were any varieties planted more largely than others?*

Reports from the extreme eastern sections show the average amount of planting of apples, chiefly, Fameuse, McIntosh and Wealthy. Along Lake Ontario, the export varieties of apples, such as Stark, Ben Davis, Baldwin, Spy and Ontario were set out in about the usual quantity. In the Niagara district, peaches and grapes were reported as being pretty largely planted. Peaches, cherries and raspberries seem to be still the favorites throughout the tender fruit districts. Peaches are being replanted in the Leamington section again. Otherwise in the West and North not much planting is being done.

3. *What were the most injurious insects of the year, and how much injury did they do?*

Codling moth, oyster-shell bark louse and curculio are mentioned, but injury was not very serious in the East, except from worms in light-bearing orchards. In the central, western and northern sections, the codling moth was reported as very bad, specially in unsprayed orchards. Owing to the light crop of apples in these parts of the Province, the proportionate amount of damage from this insect seems larger than usual. Some reports state that from one-half to one-eighth of the crop was worm-eaten. The San Jose scale is mentioned in the Niagara district as one of the most troublesome pests in the peach, plum and pear orchards, while the tent caterpillar seems to have done some damage further west.

4. *What diseases were most injurious this year, and to what extent did the apple spot fungus occur?*

In the eastern apple sections, there was practically no apple scab present. Along the St. Lawrence, however, the scab developed very rapidly on Fameuse, McIntosh, and Scarlet Pippin during the month of August, injuring fifty per cent. of the crop. In other sections, the scab was present to a greater or less degree. Most injury was done along the Lake Erie and Georgian Bay counties. Among the tender fruits, the cherry and plum suffered badly from rot. Twig blight is mentioned as spreading in the Guelph section.

5. *Give a list of the varieties of apples you recommend for your district.*

For the Eastern counties along the St. Lawrence and Ottawa Rivers, the following list is preferred:

Alexander.
Baxter.
Canada Baldwin.
Duchess.
Scott's Winter.
McIntosh.
Milwaukee.
Northwestern Greening.
Scarlet Pippin.
Transparent.
Wealthy.
Wolf River.
Fameuse.

Along Lake Ontario, the following varieties are mentioned:

Baldwin.
Ben Davis.
Blenheim.
Duchess.
Fameuse.
Golden Russet.
Hubbardston.
King.
Ontario.
Seek.
Greening (Rhode Is.)
Wolf River.
Wealthy.
Stark.
Spy.

With the exception of Ben Davis, the above list is suitable for Western Ontario. The following additions are mentioned: Newton, Ribston, Mann, Tolman and Transparent.

For the Lake Simcoe District, the following are recommended to be top-grafted: Baldwin, Greening, King, Ontario and Spy. Additional varieties mentioned are Alexander, Ben Davis, Colvert, Duchess, Fallawater, Gano and Wolf River.

6. *Were the crops of apples, plums, etc., light, medium or good on the whole?*

In the extreme east, all crops except cherries are reported good. Along Lake Ontario, the main crop, apples, is reported light to medium. Other fruits light or a failure except small fruits, which are generally good. In the Niagara district, reports state peaches, good; plums (Japan), good, (others) light to medium; cherries, light; pears, light to good; apples, light; strawberries, light; grapes, medium to good. In other sections, plums are given as a good crop, apples light, strawberries good.

7. *Are there any varieties of fruit, not generally grown that you would recommend for your district?*

The Herbert raspberry is reccommended for more general planting. The Milwaukee and Northwestern Greening seem worthy of extended planting as hardy varieties in the east and north. All varieties of grapes should be planted along the Lake Erie shore for general trial.

In regard to this question, the general concensus of opinion seems to be that greater attention should be given to improving the quality of fruit from the varieties that are already extensively planted.

8. *Give notes and results from spraying this year.*

Spraying is not extensively practised in the eastern part of the Province. Where the Fameuse type of apple is the favorite, greater precautions will be necessary if the crop is to be clean and marketable. One report states that three sprayings gave 80 per cent. clean fruit, one spraying gave 50 per cent., while unsprayed trees gave from 10 per cent. to 50 per cent. clean fruit. Another report from the east, states that from this year's experience, spraying must be done to succeed. There was a marked difference between sprayed and unsprayed orchards this season, especially in regard to wormy apples.

Results with the plum rot and San Jose scale were not so favorable, reports varying widely. Better results were reported from the use of Bordeaux in its various forms upon cherries for the control of the rot, some stating that the disease was entirely checked. For the scale, lime-sulphur mixture and Carlson's mixture are reported as the best remedies, but neither of these were entirely satisfactory.

In the west, reports state that where the spraying is properly done, good results follow, while where a poor machine and coarse nozzles are used, the results are not satisfactory. At the College in Guelph, where the spraying was thoroughly done, an excellent crop of fruit of good quality was the result.

9. *What were the average prices offered for apples and were many buyers present?*

Prices ranged from $1.00 to $1.50 per barrel in the orchard for XX and XXX, and from $2.00 to $3.00 for the same grades packed ready for shipment. Local buyers took the crop in most instances.

10. *Notes on scarcity of labor, effects of cultivation, special conditions of climate, etc.*

Labor is reported scarce, even unskilled labor being hard to get at any price. Some fruit was lost owing to this scarcity, and much of it was badly packed. Cultivation of the orchards was neglected in many instances, owing to the wet weather and this scarcity of labor. Where orchards were cultivated, the fruit was not as highly colored as orchards in sod owing to the excess of moisture. Along Lake Erie, rain was lacking almost entirely from July 12th to August 10th, while elsewhere in the Province, especially early in the season, the rainfall was excessive.

APPENDIX "E."

REVISED CONSTITUTION AND BY-LAWS OF THE FRUIT GROWERS' ASSOCIATION OF ONTARIO.

Preamble.

The objects of the Fruit Growers' Association of Ontario shall be the advancement of the science and art of horticulture in all its branches.

(*a*) By holding an Annual Convention for the consideration of questions relating thereto.
(*b*) By co-operating in every possible way with district and local fruit growers' associations and horticultural societies hereinafter mentioned.
(*c*) By collecting, arranging and disseminating useful information.
(*d*) By co-operating with the Ontario Department of Agriculture in all matters pertaining to the advancement of horticulture.
(*e*) By holding an annual exhibition of fruit and other horticultural products and awarding premiums in connection with the same.
(*f*) And by such other means as may from time to time seem desirable.

Name.

1. This Association shall be called the Fruit Growers' Association of Ontario.

Membership.

2. Any person interested in horticulture may become a member by payment of one dollar per annum in advance, either to the general secretary or the secretary of any district or local association or society in affiliation with the provincial association. A single payment of $10.00 to the general secretary shall constitute a member for life.

3. Members of this Association in good standing shall be entitled to receive regularly the official organ of the Association, a copy of the Annual Report, such other literature as may be sent out by the Association from time to time and any other privileges that may be provided or arranged for by the Association.

4. The Association year shall end on the 31st of October.

ANNUAL MEETING.

5. The Annual Meeting shall be held at such time and place as may be designated by the Association.

OFFICERS.

6. A President, Vice President, Secretary-Treasurer and Directors only shall be the duly qualified officers of the Association.

7. The Directors shall be elected at the morning session of the last day of the Annual Meeting, and shall be thirteen in number, representing the thirteen agricultural divisions as set forth in Schedule "A" of the Ontario Agriculture and Arts Act. In addition to the Directors herein provided for, the Association may at the Annual Meeting, elect such other directors from time to time as may be deemed expedient and in the interests of the Association.

8. The newly elected Directors shall at their first meeting appoint from among their number a President and a Vice-President, and also from among themselves or otherwise, a Secretary-Treasurer.

9. The President, Vice-President, Secretary-Treasurer and two other members appointed by the Directors shall constitute the Executive Committee of the Association.

DUTIES OF OFFICERS.

10. It shall be the duty of the President to preside at all meetings of the Association, decide all questions of order, and make any suggestions he may deem necessary in the interests of the Association. He shall be *ex-officio*, a member of all committees appointed.

11. In the absence of the President, the powers and duties of his office shall devolve upon the Vice-President.

12. It shall be the duty of the Secretary-Treasurer to attend all meetings of the Association, the officers and the Executive, and keep correct minutes of the same; conduct all correspondence and issue all press and other reports; prepare the report of the Executive Committee for the Annual Meeting; forward the list of representatives to the Secretaries of Fair Associations, also prepare for publication the Annual Report. As Treasurer, he shall receive and account for all moneys belonging to the Association, pay such bills and accounts as have been approved by the Executive. He shall have the power of Managing Director acting under the control and with the approval of the Executive.

13. By virtue of his office he shall be a member of each committee appointed.

14. Before entering upon the duties of his office, he shall enter into a bond, with security when required, which shall be approved of by the Directors.

15. The accounts of this Association shall be audited by an expert auditor or accountant appointed by the Executive Committee, and approved by the Minister of Agriculture for Ontario.

16. At each Annual Meeting, the retiring executive officers shall present a full report of their proceedings to the Association. A detailed statement of the receipts and expenditures for the previous year, and of assets and liabilities, a list of members and such information on matters of special interest to this Association as the officers may have been able to obtain, shall be sent to the Minister of Agriculture for Ontario within forty days after the holding of such Annual Meeting.

17. The Executive Committee shall carry into effect the plan of work decided upon by the officers, and shall arrange the details of the same.

18. The officers, or the members of the Executive, or of any Committee may conduct by correspondence, the duties assigned to said officers, Executive or Committee, by the Constitution and By-laws, or by the Association, when such a course is deemed advisable by said officers, Executive or Committee.

19. In case a vacancy occurs in the officers or directorate ,the Executive Committee may fill said vacancy forthwith.

COMMITTEES.

20. The Association may appoint such committees from time to time as may be deemed expedient, and the first person named thereon shall be declared chairman of each committee.

21. The actual and reasonable expenses of officers and members of committees when attending meetings in the interests of the Association shall be defrayed out of the funds of the Association.

NOTICE OF MEETING.

22. (*a*) At least two weeks' notice shall be given of each annual and general meeting, naming time and place of meeting. Notice may be given through the public press and by circular letter mailed to each member.

(*b*) An officers' meeting shall be called by mailing at least ten days before date of meeting to each officer, a notice of meeting as above provided.

(*c*) Similar notice shall be given to each member of the Executive before an Executive meeting is held.

(*d*) An Executive meeting may be held on shorter notice, provided each officer is otherwise notified and consents thereto.

QUORUM.

23. (*a*) Not less than ten members shall be a quorum to transact business for the Association; not less than five members shall be a quorum at an officers' meeting; and not less than three members shall be a quorum of an Executive meeting.

(*b*) Any member of the Directorate or Executive not present at a meeting, if he send his views in writing, shall be considered as present.

AFFILIATED SOCIETIES.

24. Local Fruit Growers' Associations and Horticultural Societies in affiliation with this Association may be organized in any locality where it is deemed advisable, and it shall be the duty of the officers and directors of this Association to encourage the formation of such local societies.

25. The membership fee in the aforesaid affiliated societies shall be the sum of one dollar per annum payable in advance. Of this amount the local secretary shall transmit to the Secretary-Treasurer of this Association, the sum of seventy-five cents for each member, the payment of which shall entitle the members of the local society to all the privileges and advantages of membership in this Association.

26. The proceedings of such affiliated societies, shall on or before the first day of November each year be forwarded to the Secretary of this Association, who may use such portions for the Annual Report to the Minister of Agriculture as may seem to him of general interest and value.

27. Each affiliated Society is further expected to send one duly accredited delegate to the Annual Meeting of this Association for each fifty or more members, and the expenses of said delegates shall be paid by this Association.

28. The Directors of this Association for the Agricultural District in which any society if formed shall be *ex-officio*, a member of the Directorate of such affiliated societies and receive notice of all its meetings.

CHANGE OF CONSTITUTION.

29. This constitution and by-laws may be amended by a majority of members present at an Annual Meeting or a special meeting called for the purpose of considering the same, and of which two weeks' notice shall be given.

APPENDIX "F."

THE LATE DELOS W. BEADLE, B.A., LL.B.

17 October, 1823—30 August, 1905.

During the year 1905 there passed quietly away in the city of Toronto one of two then living constitutional members of the Ontario Fruit Growers Association, in the person of Mr. Delos W. Beadle. To this gentleman in no small degree, is due the early progress and development of the fruit growing interests of this Province and some lasting tribute to his memory is justly due from this society.

Mr. Delos W. Beadle inherited a taste for horticulture from his father, Dr. Beadle of St. Catharines, who was one of our earliest Canadian nurserymen. He was born in that place on October 17, 1823, and was prepared for college at the Grantham Academy, now the St. Catharines Collegiate Institute. In September, 1841, he entered the sophomore class in Yale College, New Haven, Conn., where he obtained his B.A. degree in July, 1844, and two years later he received his B.A. (*ad eundum*) from the University of Toronto. In 1874 he received his LL.B. degree from Harvard University, Cambridge, Mass., and in 1848 he was called to the bar in New York City, where he practiced law for about 6 years. His failing health made it necessary for him to seek an outdoor life. He accepted from his father an interest in the nursery business, in which line he continued until his retirement in 1887.

When the Hon. George Brown began the publication of the Canadian Farmer, Mr. Beadle undertook the charge of the horticultural department and continued to edit it for several years.

In January, 1859, the Fruit Growers' Association of Upper Canada was organized in the City of Hamilton, with 18 members. Judge Campbell was the first president, and Arthur Harding, the first recording secretary. On the 16th of January, 1861, Judge Logie of Hamilton, was elected president and D. W. Beadle, secretary, a position which he filled for twenty years with such distinguished ability, that his statements on matters horticultural were everywhere in Canada looked upon as authoritative and reliable. Dr. William Saunders in his annual address, as president in 1884, says of him: "While I acknowledge with pleasure the valuable aid rendered by my much esteemed predecessors in the presidential chair, the lamented Logie, W. H. Mills, Dr. Burnet and P. C. Dempsey and esteem it an honor to wear their mantle, I feel free to say with no fear of contradiction, that the Fruit Growers' Association owes its present high position and influence more to its able secretary than to any other man belonging either to the past or to the present."

At the suggestion of Mr. Beadle, the publication of the Canadian Horticulturist was undertaken in January, 1878, by our Association. His idea was that such a publication would serve to hold together the membership by affording a means of constant intercommunication of ideas, suggestions and experiences in horticulture throughout the round year. As an evidence that Mr. Beadle's abilities were recognized abroad, we may add that on the 10th of November, 1862, he was elected corresponding member of the Horticultural Society of London, England.

In the year 1887, Mr. Beadle sold out his nursery business in St. Catharines to the D. W. Beadle Nursery Company. At the same time he resigned as secretary of the Ontario Fruit Growers' Association and editor of the "Canadian Horticulturist." His most valuable book, "The Canadian Fruit, Flower and Kitchen Gardener," was dedicated to the President and members of the Ontario Fruit Growers' Association. The rest of his life he spent in Toronto, a student of nature and botanical research until his lamented death, the 30th of August, 1905.

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Twelfth Annual Report

OF THE

Fruit Experiment Stations

of Ontario

UNDER THE JOINT CONTROL OF

THE ONTARIO AGRICULTURAL COLLEGE, GUELPH

AND

THE FRUIT GROWERS' ASSOCIATION OF ONTARIO

1905

PUBLISHED BY THE ONTARIO DEPARTMENT OF AGRICULTURE, TORONTO

PRINTED BY ORDER OF

THE LEGISLATIVE ASSEMBLY OF ONTARIO

Printed by L. K. Cameron, Printer to the King's Most Excellent Majesty
Toronto, 1906

WARWICK BRO'S & RUTTER, Limited, Printers
TORONTO

To the Honorable WILLIAM MORTIMER CLARK, K. C.,
Lieutenant-Governor of the Province of Ontario.

MAY IT PLEASE YOUR HONOR:

I have the pleasure to present herewith for the consideration of your Honor the Report of the Fruit Experiment Stations for 1905.

Respectfully yours,

NELSON MONTEITH,
Minister of Agriculture.

TORONTO, 1906.

TWELFTH ANNUAL REPORT

OF THE

Ontario Fruit Experiment Stations.

To the Honorable the Minister of Agriculture:

SIR,—I have the honor to present for your consideration the Twelfth Annual Report of the Ontario Fruit Experiment Stations, containing valuable reports from our fruit stations and some important plans for further progress. The revised and complete edition of "Fruits of Ontario" will be issued later as a separate report.

I have the honor to be, sir,

Your obedient servant,

LINUS WOOLVERTON,

December, 1905. *Secretary of the Board of Control.*

Fruit Experiment Stations.

BOARD OF CONTROL, 1906.

G. C. Creelman, B.S.A., Professor of Agricultural College, Guelph	Chairman.
H. L. Hutt, B.S.A., Professor of Horticulture	Guelph.
W. T. Macoun, Horticulturist at Central Experimental Farm	Ottawa.
Elmer Lick, Director of Ontario Fruit Growers' Association	Oshawa.
A. M. Smith, Director of Ontario Fruit Growers' Association	St. Catharines.
P. W. Hodgetts, Secretary of the Ontario Fruit Growers' Association	Toronto.
Linus Woolverton, M.A., Grimsby	Secretary.

EXECUTIVE COMMITTEE.

G. C. Creelman	Chairman.
Prof. Hutt	Inspectors.
L. Woolverton	
P. W. Hodgetts	Sec. O. F. G. A.

THE ONTARIO FRUIT STATIONS.

Name.	*Fruit.*	*Experimenter.*
1. Southwestern	Peaches	W. W. Hilborn, Leamington.
2. Wentworth	Grapes	Murray Pettit, Winona.
3. Burlington	Blackberries and Currants	A. W. Peart, Burlington.
4. Lake Huron	Raspberries	A. E. Sherrington, Walkerton.
5. Georgian Bay	Plums	J. G. Mitchell, Clarksburg.
6. Simcoe	Hardy Apples & Hardy Cherries	G. C. Caston, Craighurst.
7. Bay of Quinte	Apples	W. H. Dempsey, Trenton.
8. St. Lawrence	Hardy Plums and Hardy Pears	Harold Jones, Maitland.
9. Strawberry Station		E. B. Stevenson, Ponsonby.
10. Maplehurst	Cherries, Peaches, Pears, Plums, and other tender fruits; also a general collection of all kinds of fruits for descriptive work for "Fruits of Ontario."	L. Woolverton, Grimsby, Ont.
11. Algoma	Hardy Fruits	C. Young, Richard's Landing.

Fruit Experiment Stations, 1905.

THE SECRETARY'S REPORT.

By Linus Woolverton, Grimsby, Ont.

During the year 1905 the work planned by the Board of Control has been carried out by your Secretary and by the various experimenters as fully as possible.

The following list of fruits for testing at all stations was sent each experimenter, asking that he mark out any that would duplicate varieties already planted, and the lists as revised were duly ordered for each station. Some of the varieties, however, could not be secured, and must be included in the new lists for 1906.

Fruits for Testing at all Stations.

Apples. Gravenstein, Ontario, Cranberry, Louise, Wolf, Alexander, Bogdanoff, Duchess, Transparent, Milwaukee, Charlamoff, Longfield, Boiken, Patten's Greening, Russell, LaVictoire, Windsor Chief, Mammouth Black Twig, Huntsman, York Imperial, Brockville Beauty.

Peaches. St. John, Fitzgerald, Lewis, Champion, Elberta, Longhurst, Carlisle, Smock, Carmen, Emperor, Niagara, New Prolific, Banner, Beers Smock, Klondike, Leamington, Millionaire.

Cherries. Orel, Richmond, Montmorency, Brusseler Braune, Late Duke, Lutovka, Suda Hardy, Koslov, English Morello, Byng, Windsor, Dyehouse, Elkhorn, Mezel, Homer, Compass.

Apricots. Shense.

Pears. Pitmaston, Hoosic, Wilder, Chambers, Louise, Triomphe de Vienne.

Plums. Red June, Chabot, Late Orange, Whittaker, Maynard, Richard Trotter, Dunlop, Stoddart, Emerald, Don.

Grapes. Campbell, Charlton, McPike.

Currants. Wilder, Ruby, London, Cherry, Prince of Wales, Champion, White Versaillaise.

Blackberries. Ancient Briton, Eldorado, Agawam, Child's Tree, Lincoln, Ozark, Lawton, Snyder, Eureka, Rathbun, Early Cluster.

Raspberries. Herbert, Cumberland.

Gooseberries. Columbus, Champion, Golden Prolific, Oregon, Jumbo.

The following varieties of apple trees were sent out by W. T. Macoun, Horticulturist Central Experimental Farm, Ottawa, to our experimenters in New Ontario, in the Temiskaming District, viz.: Transparent, Milwaukee, Duchess, Charlamoff, North West Greening, Wealthy, Patten's Greening, Hibernal, McMahon White, Scott's Winter; also the following hardy kinds of plums, viz., Bixby, Mankato and Don.

At the Southwestern Station in Essex, where the peach orchards have been twice killed out by winter freezing of the roots, five acres were planted to peach trees for the especial object of testing various methods of winter protection, for the encouragement of this important industry.

Our experimenter on St. Joseph's Island, having reported much damage to fruit trees from sun scald, I sent him, under the instructions of the

Board, four dozen veneer tree protectors for shading the trunks, to ascertain if this would prevent such injury.

The instructions of the Board regarding a supply of bottles for the experimenters were also fully carried out. The object of these was to enable them to keep for exhibition such early fruits as would otherwise be out of season.

VISITS TO STATIONS.

During the fruit season your Secretary made such visits to the Fruit Stations as were necessary in the work of studying fruits as they were growing and ripening under various conditions, and for the securing of normal samples of fruits for illustrations.

THE STRAWBERRY STATION. The first fruit of the season to ripen is the strawberry, and, where soil conditions are favorable and proper methods of cultivation employed, it is, perhaps, the most profitable. The wonderful improvements in varieties of late years have contributed much to give the strawberry its high place among the profitable fruits, and any one who fails to secure the new and productive varieties mentioned in our reports will make a serious mistake. The extension of the season, by breeding early, mid-season and late varieties, is another important factor in successful strawberry culture, which should be carefully considered by planters.

Since our strawberry experimenter, the Rev. E. B. Stevenson, resides at Ponsonby, which is a few miles from Guelph, and since Prof. Hutt has on the College grounds every desirable variety under trial, I thought best to go up on the 27th of June and look over the collections.

The results of the tests by Prof. Hutt, and of those by Mr. Stevenson, do not always harmonize, neither do the reports of one year on the same grounds always harmonize with those of another concerning the same varieties. I am of the opinion that this is in part due to the limited extent of the experiment. One hundred and fifty varieties, giving 12 feet to 20 feet of row to each does not afford sufficient test of commercial varieties. I would recommend the same course of procedure which I advised the Board of Control last year, viz., that ten or a dozen of the most productive varieties be selected, and of these say fifty or one hundred plants be sent each experimenter, insisting upon exact reports from each upon vigor and productiveness. We would thus be very soon in a position to recommend certain varieties with absolute confidence; and, further, we might be able to say which varieties were best suited to the different districts, and to the different soil conditions.

THE CHERRY STATION. The second fruit to ripen is the cherry, and all known kinds of this fruit are being tested on my own grounds. Unfortunately, as you will see from my Cherry Report, the season has been a most disastrous one for this fruit. Many orchards of Sweet cherries bore little or no fruit, while, owing to the continuous wet in picking season, what fruit was produced rotted before ripening. Certain varieties, however, seemed to be almost rot-proof, as, for example, the Orel, Russian 207, Dyehouse, Purity, Richmond, and Montmorency. I would advise sending a dozen or more trees of each of these varieties to each station.

THE RASPBERRY STATION. Closely succeeding the cherry is the raspberry, a fruit which is becoming every year more popular with housekeepers. Indeed, there is no fruit which has such an exquisite flavor either in jam, preserves, or canned, as the raspberry, and the demand is bound to increase rapidly. We are testing all varieties of the raspberry at Walkerton on the grounds of Mr. A. E. Sherrington, who is keeping careful records of the behaviour and comparative merits of each. I visited his experimental grounds on the 2nd of August, and found him in the midst of his raspberry harvest. Prominent among his varieties of red raspberries stood the Herbert, for its vigor of bush and its productiveness. It appears as though in the near future it will be Herbert and Cuthbert for favorite market berries instead of Marlboro and Cuthbert, as at present. When we plant a lot of varieties side by side it is surprising how many of the new varieties, which have been introduced as superior to any in existence, are at once shown to be inferior. Mr. Sherrington will ask the Board to allow him to weed out a great number of the varieties now in his plantation, and to plant more freely of certain promising kinds. Of black, for example, he finds Miller and Older too small to be profitable; of white, Caroline and Golden Queen are useless; and of the purple, neither Shaffer nor Columbia are to be recommended for his district.

The Herbert should be planted freely at all our stations so that we may know its real value for the practical fruit grower as quickly as possible, because, if it bears out present promises, the sooner the fact is known the better.

Gooseberries are doing remarkably well with Mr. Sherrington, and for fruit growers in his district they appear to be well worthy of consideration for planting as a market fruit. The Red Jacket, for example, bears most abundantly at Walkerton, and sells at a remunerative price. I would advise the Board to send Mr. Sherrington a liberal number of plants of Red Jacket, Keepsake, Whitesmith, and Pearl, for careful tests as to yield and selling price.

There being no peaches at the Peach Station in Essex, and very few plums at the Plum Station in Grey, I did not visit these stations this season; nor the apple stations east and north, having visited them so recently.

The Hamilton Fruit and Flower Show.

In accordance with instructions from the Minister of Agriculture, the Honorable Nelson Monteith, I made an educative exhibit of fruit at this show, which was held in the Thistle Rink on the 12th, 13th and 14th of September, 1905. There are two large rinks, one of which was devoted to flowers and the other to fruits.

In making the Experiment Station exhibit those stations only were invited to contribute which are in the Hamilton District, viz., Burlington, Wentworth and Lincoln, the latter being represented by the Secretary's collection.

These exhibits were of great interest to the visitors, covering five large tables, or about three hundred square feet of space, on the left of the entrance of the fruit rink. They were distinctly labelled "Ontario Fruit Stations," and your Secretary was in attendance, not only during the whole three days of the Fair, but, also, the day previous, setting up the exhibit, and the day after for its removal.

The Burlington Station showed a fine collection of apples and pears, including several baskets, packed with choice fruit, ready for market. The principal feature of this exhibit, however, was the excellent show of all varieties of red, black, and white currants, put up in bottles with formalin. Branches had been cut and placed in the bottles, to show the manner of fruiting. The liquid was perfectly clear, and showed the fruit in a perfect appearance.

The Wentworth Station showed a very large collection of varieties of grapes, divided into two lots, the one containing the most desirable kinds, the others those new, or undesirable, or of which the merits are, as yet, not fully decided upon. It is worth noting, however, that some kinds which have been condemned other seasons, have this year showed considerable merit. It is, therefore, evident that tests must extend over several seasons to be at all accurate.

From the Secretary's fruit farm, on which a large collection of varieties has been planted for study and description, a great variety of apples, pears, peaches, plums, and grapes were shown, covering about one-half the whole space. Among these was a collection of Japan plums, which attracted the attention of fruit growers. The kinds shown were Burbank, Wickson, Satsuma, Hale, Golden Prolific, and Chabot. Among the pears some fine export varieties were shown, including Anjou, Clairgeau, Hardy, Duchess, Bosc, Louise, Pitmaston and Triomphe de Vienne. For home markets there were shown such varieties as Giffard (in bottles), Bartlett, Clapp's Favorite, Hoosic, Sheldon, Seckel, Souvenir de Congres, Elizabeth, Petite Marguerite, etc. Some of the newer varieties of grapes shown were Ohio, Black Giant, Woodruff, Early Victor, Diamond, Green Mountain, Empire State, etc.

On the whole this kind of an exhibit, with a Superintendent to give information about the varieties suited for home uses, for export, for home markets, and about novelties tested at the stations, promises to be of great service to practical fruit growers. Another important service which can be rendered fruit growers is the identification of varieties. Judges often give prizes to kinds wrongly named, not knowing the variety sufficiently well to detect the attempted imposition by an exhibit, or to correct his error. Sometimes a variety is misnamed by all growers of a section through the error of a nursery man; for example, near Collingwood, the writer once found the Clairgeau grown by several people, and exhibited as Louise. An expert in charge of our experimental exhibit can often correct these errors, and it would be well if the authorities of Fairs would accept such a person as referee.

The Toronto Fruit Show.

In response to my request as authorised by the Board of Control, the fruit stations made a very fine exhibit in Massey Hall. The place assigned was unfavorable, being at the centre of the front, under the gallery, where the light was dim. The table also was too wide to show the fruit placed on the far side, which was only approachable from the front.

The Experiment Sation exhibits covered about 400 feet square of table space, and were of great interest to fruit growers. The principal varieties, which were recommended for each district for commercial purposes, were shown in pyramids, and those still under test in plates of five. Thus, Mr. Jones, of the St Lawrence district, showed a large pyramid each of Fameuse, McIntosh, and Scarlet Pippin; Mr. Dempsey, of King, Ben Davis, Fallawater, Ontario, Stark, Baldwin, Spy, Fameuse and McIntosh; Mr. Peart, of Baldwin, Greening, Spy, etc.

Mr. Sherrington showed quite a variety of fruits, especially in bottled currants, cherries, and raspberries. The complete list of fruits, shown by him, will given some idea of the extent of the exhibits of varieties shown by each of our experimenters, so we subjoin his list in full.

Apples. Golden Russet, Ben Davis, Barry, Cranberry Pippin, Fameuse, Grimes Gilden, Greening, Hurlbut, King, McIntosh, North Western Greening, Ontario, Pewaukee, Pound Sweet, Ribston, Salome, Spy, Seek, Seedling, Tolman, Transparent, Wealthy, Wagener, Winter Banana.

Pears. Kieffer.

Cherries. Dyehouse, Downer's Late, Empress Eugenie, English Morello, Early Richmond, Late Duke, Montmorency, Ostheim, Olivette, Reine Hortense, Wragg, Yellow Spanish.

Strawberries. Brandywine, Saunders, Strawberry-Raspberry.

Currants. Black Victoria, Champion, Cherry, Fay, North Star, Naples, Pomona, Prince Albert, Red Cross, Raby Castle, Saunders, Versailles, White Grape, White Imperial.

Gooseberries. Downing, Pearl, Red Jacket.

Raspberries. Brandywine, Brinckle, Cuthbert, Caroline, Golden Queen, Herbert, Harris, Loudon, Marlboro, Miller, Phoenix, Reliance, Turner, Thompson.

Black Caps. Conrath, Gregg, Hilborn, Kansas, Ohio, Older, Smith's Giant.

Blackberries. Agawam, Eldorado, Snyder.

Mr. Caston's exhibit was in one way the most striking one of all, having two immense pyramids of Wolf River apples, many of which were 16 inches in circumference. Such Wolf River apples have not been shown before in Ontario. His Baxter apples were also remarkable for their size and beauty; and a pyramid of Peerless was most excellent, quite bearing out all that Mr. Caston has said in its favor.

I began a kind of exhibit at this show which I think can be made of still greater interest in future. I showed in one collection about twenty varieties of commercial apples, one good average sample of each variety, and each labelled in bold letters, with a shading pen. In another, twelve varieties of dessert apples, one sample of each; in another twelve varieties of pears recommended for export, etc. I found that many people stopped to study these collections and to take note of the same for future guidance.

Another educational feature which I prepared, at the suggestion of Mr. Cowan, was a card for each commercial variety with a few brief notes regarding it, which could easily be read by the visitor. We give a few examples:

GRAVENSTEIN: An apple of the very highest quality for cooking, excellent for export, succeeds in the Southern districts, and worthy of being planted widely for export.

BLENHEIM: A high grade apple to fill in between the Gravenstein and the King. Adapted to apple districts south of Kingston, Peterboro and Orillia.

BELLFLOWER: A good apple when well grown, but inclined to be irregular in form and size. Adapted to the great apple districts along the shores of lakes Erie and Ontario.

McINTOSH: A very excellent dessert apple; badly subject to scab in the southern apple districts, but successfully grown in the St. Lawrence and other northern districts.

The display of bottled currants and other fruits by Mr. Peart, and of raspberries etc., by Mr. Sherrington, were usually fine, and deserve especial mention. These unfortunately had to be set up too far back for proper exhibition; for they need to be near to the eye, and upon a line with it. In future exhibitions we hope for better instalment.

I was in attendance every day of the week to answer questions except Friday, the day of our Pomological Meeting; and the various experimenters, Mr. Sherrington, in particular, gave me much assistance in this work, as did also Mr. A. M. Smith, of our Board. This attendance upon the exhibit I would emphasize before the Board as of extreme importance, if we desire to make our work of the greatest educational value.

The Board of Control.

No change has been made in the personnel of the Board of Control. The following members having been reappointed for the year 1906, by the Ontario Fruit Growers' Association, viz.:—A. M. Smith, Port Dalhousie; Elmer Lick, Oshawa; and W. T. Macoun, Horticulturist of the Central Experimental Farm, Ottawa.

A meeting of the Board was held at the Parliament Buildings, Toronto, on the 8th of December, 1905. The first business was an interview with the Hon. N. Monteith, Minister of Agriculture, regarding the work of the Fruit Stations, after which the Board met in one of the committee rooms to hear the reports, and correspondence read by the Secretary.

All the reports from the experimenters having been received, the Secretary was authorized to ask the department for payment of their respective salaries for 1905.

The report of inspection of the various stations by Prof. Hutt was read by him, and is printed in full in this volume.

The Secretary laid before the Board his work on the fruits of the Province, having included during the year the varieties agreed upon for the first edition of a complete volume, showing all the varieties studied and described during the last seven years, in alphabetical order.

The Secretary was authorized to place or record the appreciation by this board of Mr. W. T. Macoun's action in sending to our experimenters in New Ontario such varieties of hardy apples as seemed to him worthy of test in that district.

Plans for 1906.

The following are some of the more prominent lines of work ordered for the new year.

The continuance of the exhibit at the Canadian National of the best fruits then in season, including bottled samples of small fruits; standard packages of fruit; charts showing fruits adapted to the various districts; devices for trapping codling moths and for protecting trees from mice and rabbits; spraying mixtures, etc.

The ordering of desirable varieties of the newer fruits for testing at the various stations, and recommended varieties for general test;

The appointment of a committee, consisting of Messrs. G. C. Creelman, P. W. Hodgetts and Prof. H. L. Hutt, to consider the desirability of locating another station somewhere between Walkerton and Leamington;

The continuance of an exhibit of summer fruits at the Hamilton Fruit and Flower Show, in case this is continued in 1906;

Arranging for special educative exhibits of fruit at the Toronto Fruit, Flower, and Honey Show in conjunction with those from the Agricultural College and those from the Central Experimental Farm at Ottawa;

Ordering the revision of the various sections of the Secretary's work on the "Fruits of Ontario," by various fruit experts as follows, viz.:

Apples, by W. T. Macoun, Horticulturist, C.E.F., Ottawa; Pears, by M. Pettit, Winona: Peaches and Cherries, by A. M. Smith, Port Dalhousie; Plums, by W. M. Orr, Fruitland; Grapes, by W. H. Bunting, St. Catharines; Small Fruits, by Prof. H. L. Hutt, O.A.C., Guelph; these gentlemen to act as chairmen of committees to be at their own appointment.

A NEW EXPERIMENT STATION.

In view of the changing conditions affecting the work of the Ontario Fruit Stations, the Board of Control passed a resolution expressing their views to the effect that the time has now come for a further enlargement of our work, and for taking up other lines of experimental work, such for example as the production of new and more valuable varieties of fruits; the Board therein recommended to the favorable consideration of the Hon. Minister of Agriculture, the establishment of an Experimental Farm in the Niagara district, in charge of a suitable person, who would devote his whole time to the work.

The Financial Statement for the year 1905 was presented by the Secretary, who pointed out that he had kept within the estimates in the expenditures.

THE FINANCIAL STATEMENT FOR 1905.

Salaries of Experimenters	$1,850 00
Salaries of Secretary and Inspectors	1,100 00
Fruit Exhibits and Pomological Meeting	398 27
Travelling expenses of Inspectors	112 50
Photographs of fruits	95 30
Trees and Plants for Stations	236 48
Tree protectors	3 70
Freight, express and duty	16 47
Books, Printing, and Stationery	46 75
Postage and telegrams	16 42
Board Meetings	33 27
Reporting	12 00
Albert Hall for Pomological Meeting	4 50
	$3,925 66

REPORT OF THE INSPECTOR OF THE FRUIT EXPERIMENT STATIONS.

BY PROF. H. L. HUTT, O.A.C., GUELPH.

I inspected each of the stations this year, and noted the condition and progress of the work. On the whole it has been much along the same line as last year and satisfactory progress has been made. It is hardly necessary, therefore, for me to report upon it in detail again, as was done last year. There are, however, a few general features of the work to which I wish to call your attention, and some changes which I think it advisable to make.

The Fruit Experiment Stations were established eleven years ago, primarily for the purpose of determining what varieties of the various kinds of fruits were best adapted to the different sections of the Province. At that time the fruit industry had not anything like the commercial importance it has to-day. Planters were more or less at a loss to know what was best to plant. Many of the older varieties were proving unsatisfactory, and the hosts of new ones being introduced from year to year only added to the general confusion of the planter. During the eleven years that the stations have been established, our experimenters have been testing and comparing the new with the old, with the result that the greater number of the much-lauded new varieties have been found worthless, some have been recommended for further trial, and a few have proved worthy of more general planting. In most cases the experimenters are now in a position to speak with authority in recommending the varieties most desirable for planting in their particular sections.

In so doing the Experiment Stations have brought order out of confusion, and because they have done so it might appear that they had accomplished their purpose, and the work might now be dropped. The result of such a course would not be hard to foresee; in a very few years we would be as far behind the times as we were when the work began. Our aim must be progress, and our policy should be to adapt the work of the stations to meet the requirements of the times. Inasmuch as variety testing is concerned, this must necessarily be continued as a prominent feature of the work. Our report should now give annually a list of the varieties recommended for general planting from each of the stations, indicating those most desirable for commercial planting, and those specially adapted for home use. Lists should also be given of those varieties which have been fully tested and are not recommended, stating why they should be discarded. Lists might also be given of those varieties which are deemed worthy of further trial before placing them on either of the foregoing lists.

At each of the stations there should be a general weeding out, as soon as possible, of those varieties which have been fully tested and have not come up to the requirements, and in their stead those varieties which have proved most valuable should be grown in larger numbers, at least sufficient to afford a good standard for comparison, and the new varieties appearing from time to time should be added and tested as soon as they can be obtained, so that we may still keep abreast of the times with regard to all varieties deemed worthy of cultivation.

One of the important facts brought out by the Fruit Experiment Station work is that the lists of varieties desirable for planting must vary considerably to meet the requirements of the different sections of the country. No one list will do for all parts of the country. In this particular the co-operative nature of the work has proved its adaptability to the needs of the country better than any one central experiment station could do. And this leads us to ask if we yet have enough stations to fully represent the varied conditions of all sections of the Province. Two years ago I recommended the extension of the work to include the Temiskaming district, for the benefit of the settlers going into that newer part of Ontario. Collections of the hardiest varieties of the fruits most likely to succeed in that northern latitude have been sent to four of the pioneers of that section, and a co-operative effort is thus being made to ascertain the fruit-growing possibilities of that northern part of the Province.

In the Niagara district a strong effort has been made during the past year to impress upon the Government the necessity for establishing a large Central Fruit Experiment Station for that district—one owned by the Government and managed entirely for the good of the public, where more of the problems confronting the fruit-grower might be worked out than can be attempted under the plan of privately owned stations. This matter may be outside the jurisdiction of our Board, yet an expression of opinion on the subject of this Board would not be without weight. The growing importance of the fruit interests and the multiplicity of the unsolved problems connected with it, well warrant the careful consideration of the Government and the united efforts of the growers. Unfortunately for the majority of fruit-growers, the Dominion Central Experimental Farm and the Provincial Experimental Farm are both too far away from the tender fruit belt to render as much assistance as they otherwise might. So that a third Experimental Farm, or even a Branch Fruit Experiment Farm, in the tender fruit district, might be made of great service to fruit-growers of that section.

There is another important fruit district which is not reprsented by any of the stations, and has not yet asked for a station. that is the Central Western part of the Province. Taking the County of Middlesex as a centre, we have Huron and Perth on the north, Lambton and Kent on the west, Elgin on the south, and Oxford on the east. All of these counties are more or less extensively engaged in the fruit industry, and are not represented by any of the stations. A good station, centrally located, should be of great value to that part of the Province. It would help to bring its fruit-growing into prominence, and would, no doubt, as the work has done in other places, bring out some of the prominent growers of the district and secure their co-operation in advancing the fruit interests of the Province generally. In this particular alone the Experiment Stations already established have done something which has been well worth all that has been expended upon them—they have brought into public service some of the most energetic and progressive men engaged in the fruit industry of to-day.

POMOLOGICAL MEETING.

The Secretary also reported having arranged for a pomological meeting of expert fruit growers near Massey Hall, on Friday the 17th of November, during the week of the Fruit Fair. This meeting was well attended, and served to bring out many important details concerning the behavior of varieties in the various districts. The following is a report of the addresses and discussions at this meeting.

CO-OPERATION IN PLANTING.

By Linus Woolverton, Grimsby.

Co-operation is without doubt the keynote of successful fruit growing in this twentieth century. Slowly, very slowly, our fruit growers are awakening to the importance of united effort. It was not until the unbusiness-like methods of sale forced down the prices of fruit so low that little or no profit remained to the owner of an orchard to meet the value of time and labor, and interest on investment, that he was willing to enter into co-operative work.

The first move has been co-operation in sales. Local organizations have been formed, the members of which place their fruit under the control of the Association so that contracts are made for the sale of it to distant buyers in car lots.

Next comes co-operation in packing, which means that all fruit handled by the Association is graded to uniform size and quality, either individually subject to the inspection of an overseer, or at a central packing house; each man to receive pay according to grades of his fruit.

Then we have co-operation in spraying, which included a power sprayer and an expert to run it and to do the work thoroughly, which is the only kind of spraying that counts. Perhaps Mr. Tweddle's ideas may prevail. Mr. Tweddle is a progressive fruit grower of Fruitland, near Hamilton, who has made a specialty of pruning and spraying apple orchards. He says it should be one of the conditions of membership of a local fruit growers' Association, that each member have his trees cultivated, pruned and sprayed according to certain rules, so that the fruit sent out should be of the very highest grade of excellence.

All these are important points of progress, but there is still one that receives too little, if any consideration, and that is co-operation in planting. The curse of many orchards in Ontario is the great collection of useless varieties often found in them. Some ten years ago when I was asked by the Dominion Department of Agriculture to make up experimental shipments of pears and peaches to Great Britain, I found it almost impossible to collect enough cases of any one good variety of each to make a fair showing upon any large market. Mixed lots are slow of sale and often bring low prices. This difficulty can be remedied by co-operation in planting. The local Association should decide upon the most desirable varieties of apples, pears, peaches, grapes and cherries for the section represented, and see that a sufficient average is planted to each variety by members of the Association to make up car lots of the same for shipments, either to our Great North-West or to Europe.

It is to aid in deciding upon the most desirable kinds to plant in quantity for profit in each locality, that the work of the Ontario Fruit Stations has been conducted during the past ten years, and I think we have in that period made much progress in the way of proving what kinds should be planted and what should not in the various sections.

Take pears for example. We have an excellent market for the Bartlett in the Winnipeg market, a market that will take larger quantities every succeeding year. But in what section of Ontario can this pear be put up in car lots, outside of the Grimsby and the Burlington district?

For export to Great Britain again we have several kinds that give excellent returns, and which grow to perfection in many parts of the Province, for example we may name Howell, Bosc, Pitmaston, Duchess, Louise, Clairgeau, Anjou, Diel, Easter Beurre and others. Put up in half bushel cases and carefully packed and shipped in lots of a few hundred cases of a variety there is almost an unlimited market abroad, with most encouraging returns; but where in this Province can you find a sufficient number of bushels of any one of these varieties to make up a respectable shipment. The plantations of pears are small at the best, and selection of varieties has been made hitherto with an eye to local markets only. Now we begin to find a surplus which these markets cannot use, and we must seek distant markets or sell at losing prices.

Here there is work for our local Associations, viz., to decide upon the markets to be taken up and then plant varieties suitable for these markets, and in quantities sufficient to make proper shipments.

Again in apples; is it not strange that in no section of Ontario can you find an orchard of Gravenstein? Here is one of the very finest fall export apples, with no competitor that can compare with it in beauty, or in quality for shipment about the 1st of September; an apple that has made the Annapolis Valley famous, and which may be grown just as successfully in Ontario as in Nova Scotia, and yet it is comparatively unknown in our Province.

Another apple too little planted with us is the Blenheim. This fine apple just fills in a gap between Gravenstein and King and brings long prices in the British markets, but who knows of any section in which a buyer could gather up a carload of Blenheim?

In grapes, also, I believe co-operative planting would tell to the advantage of the growers. The Concord and the Worden are grown extensively, but are both wretched shippers. The Worden loosens from the stem and the Concord, though holding on a little better, is too tender in skin and very soon deteriorates. We tried exporting it to Great Britain one season but the experiment was a failure. This season I tried shipping it to British Columbia, sending it to such points as Rossland, Grand Forks, Phoenix and Greenwood, but in every case they landed in poor condition, though packed with great care.

The question for us to solve under this head is, what grapes can we grow that will carry well and command a good price? Perhaps Wilder or Agawam or Lindley would answer; if so, Associations in grape sections should see that these varieties are planted by their members. Now it is along these lines that our Fruit Experiment Stations are at work, attempting to help in settling the vexed question of what varieties are best suited for planting in each section for profit, and in this work we invite the earnest co-operation of the members of the Ontario Fruit Growers' Association.

The CHAIRMAN: What do you think of the desirability of introducing any new variety of apples?

ALEX. MCNEILL: It would be a dangerous experiment to introduce any new variety too hastily. I think we should experiment with a great many varieties, but we should distinctly discourage the planting of new or unknown varieties. For that reason I commend most heartily the suggestion that Blenheim should be planted. The Blenheim is not as good an apple in many sections as the Baxter, but the man who plants Baxter has to make his market to some extent, whereas Blenheim is well known in England, and there would be no impropriety in planting it in large quantities, as there would be no difficulty in disposing of the crop. When it comes to introducing a new variety with a new name, I should distinctly discourage it among the farmers. There should be years of patient experiment with any new variety, no matter what its merits may be, before it should be recommended for extensive planting. I commend the spirit of the address most heartily. The idea of co-operative planting, and thus doing things on a larger scale, is in complete accord with the recommendations of the Department with which I am connected.

The CHAIRMAN: You do not call Gravenstein a new variety?

Mr. MCNEILL: No, you would be perfectly safe with it.

The CHAIRMAN: I understand that the commission merchants complain bitterly as to the great number of varieties which come to the commission houses in small quantities. If you introduce another variety such as Gravenstein, unless it could be introduced very widely, would it not still further increase the difficulties of the commission men?

Mr. MCNEILL: You can sell Gravensteins in considerable quantity anywhere and at any time. A man who has a carload to dispose of can make a fairly good bargain. If it could be put on the market in car lots, it would be at no disadvantage. It would be very different from planting new and rare varieties, because in the latter case you could not sell your crop to advantage.

Mr. A. E. SHERRINGTON, Walkerton: Gravenstein does not do well in my section, but Blenheim does excellently.

Mr. W. H. DEMPSEY, Trenton: I do not think there is any difficulty in selling Gravenstein if you have from ten to twenty barrels. The Ottawa market will take them readily and at an advance in price over other apples of that season. I think Gravenstein could be grown to advantage in our section. Blenheim is slow in coming into bearing and in some sections it does not produce in sufficient abundance.

Mr. MCNEILL: In Nova Scotia they discontinued planting Gravenstein to any extent because transportation facilities were such that they could not be sure of getting the fruit to market safely, but during the last two years these facilities have improved so much that this variety is again becoming the best paying apple they grow. It has become very subject to collar rot there, however, and is such a weak tree that they are afraid to plant it on that score.

Mr. Woolverton: Gravenstein is one of the finest and most vigorous growers I have in my orchard. The fruit is very fine. Just as good as any in the Annapolis Valley.

Mr. Robertson, Lindsay: For what section would you recommend Blenheim?

Mr. Woolverton: I think it succeeds in your county. It certainly is a success in the Niagara Peninsula.

Mr. W. T. Macoun, Horticulturist, Ottawa: I find Blenheim one of the tenderest varieties we have at Ottawa. I should be afraid to plant it at Peterborough. Gravenstein is also very tender with us.

A Member: In the vicinity of Belleville, Blenheim stood the test of the recent severe winters.

Mr. Harold Jones: With me Gravenstein is weak and has been killed back. Blenheim has been killed outright.

Mr. Dempsey: One of the reasons why Gravenstein is tender is that it bears heavily each alternate year. If a severe winter follows a heavy bearing season, the tree will be injured.

DESIRABLE NOVELTIES AMONG APPLES.

By W. H. Dempsey, Trenton.

We hear a great deal nowadays about new varieties being introduced, and about hybridization. We are apt to lose sight, I think, of the great work done thirty or forty years ago by some of the members of the Fruit Growers' Association who were among its founders. Charles Arnold worked on the Spy and Wagener and produced the Ontario and several sisters to it, but the Ontario is the best of his creations. From the union of Spy and Golden Russet, my father, Mr. P. C. Dempsey, produced Trenton and Walter. Trenton is one of the best early shipping varieties we have, and has never sold in Liverpool or Glasgow, at less than twenty shillings a barrel. In small fruits there are a number obtained by crosses made by Dr. Saunders when at London. At the present time Mr. Macoun is also doing a very important work in the production of new varieties.

We should, however, be very careful about recommending the planting of new varieties. We have a lot of old varieties which are widely grown, and it is easy to select from them varieties which will suit any apple growing section. Blenheim requires a heavier soil than some varieties and, where it is suited to the section, it will produce abundantly. The same is true of Gravenstein and Trenton. Trenton on quite light land is the most profitable variety I have. Ontario is larger than Spy with me, but it is, if anything, more tender in the skin than the Spy.

Of the new varieties Coo's River Beauty attracts me more than any other. I received it from a California Experiment Station. The first year it fruited, it did not promise well as the fruit dropped early and was not very good. Last year the fruit hung to the tree until late in the season and kept fairly well. This year the bulk of the fruit was picked last Saturday, and there were fewer specimens on the ground than in any other variety. The tendency to fall off is a great drawback to many varieties, such as Wealthy, Snow, Blenheim, and Cranberry Pippin the latter being one of the worst. Coo's River will class as to quality with the

Snow and the McIntosh and it is as fine in appearance as Wealthy. York Imperial has shown up better with me this season than in any previous season. The trees bore a nice crop this year and looked very promising. Windsor Chief still looks promising, is of fair quality, and hangs to the tree well. Winter Maiden's Blush impresses me more favorably this year than in any season yet. The fruit is very evenly distributed over the tree, which produces a good crop of large apples of good quality. Sutton's Beauty is not doing well and appears subject to green aphis and to twig-blight, and the tree is apparently weak. It is not frozen back but does not come on rapidly.

Mr. Woolverton: What about Salome and Jonathan?

Mr. Dempsey: I have had no experience with Salome. The fruit of Jonathan is of good quality but entirely too small with me.

Mr. Woolverton: It grows beautifully in some parts of the United States.

Mr. Armstrong: What district do you represent?

Mr. Dempsey: North Durham, Hastings, and Prince Edward, including the Bay of Quinte section.

A Member: Do you find Ontario more tender than Spy?

Mr. Dempsey: I have some Ontario but they are nearly all top grafted. Those grafted on hardy but unhealthy wood have shown weakness. I find the Ontario subject to canker and that it is a poor slow-growing tree.

Mr. Sherrington: My Ontarios on their own stock are useless, but top grafted on Crabapple stock, they are quite hardy.

Mr. Dempsey: I have seen Ontario trees 12 years planted in Hastings county that are perfectly hardy and in good condition. They bear early.

Mr. Macoun: We have top grafted about ninety varieties of tender apples on hardy stocks, the idea being to find out whether the stock made the tree any hardier. We find it does not. It makes a difference if the trunk is tender, such as Ontario. In that case it is good to top graft on a hardy trunk. As regards the new growth, the hardiness of the stock does not influence it. Spy top grafted on Duchess killed down to the stock. Where two varieties were grafted on the same stock, the tender one was killed outright and the hardy one left.

Mr. Dempsey: If you graft a hardy variety on tender stock, does it not have the tendency to make the top tender?

Mr. Macoun: I can give no opinion as to that. Where a tree has a weak trunk, there is no great advantage in top grafting. It is well known that top grafting on hardy stock increases earliness.

Mr. Robinson, Lindsay: McMahon White is very successful with me. The tree is healthy, the most hardy we have and bears annually.

Mr. Dempsey: It is not a good apple to market on account of the color, but it is well liked for cooking purposes.

Mr. Robinson: We find that Ontario on its own stock dies out in our district. I grafted it on Duchess and it did well until the severe winter of two years ago, when every branch was killed.

HARDY CHERRIES.

By G. C. Caston, Craighurst.

Situated as I am half way between Georgian Bay and Lake Simcoe and away from the moderating influences of the Great Lakes, I am unable to grow successfully any but the sour varieties of cherries. The winter of 1903-1904 was the coldest in twenty years, and the varieties that survived may, I think, be classed as perfectly hardy. Among these are Orel 24 and Ostheim. Orel is one of the best we have, and my favorite among the Russian cherries. It is not a fast grower but is very hardy. The fruit is very nearly black when ripe and of very fair quality. Next on my list to Orel 24 I would recommend Ostheim. Dyehouse is another good variety but the tree is not long lived and was injured during the winter I referred to. Russian 207 is third on the list. It is a large bright red cherry, and it is of better quality even than Dyehouse or English Morello. The latter is the finest cherry in my section; it begins to bear early and yields very abundantly, but I do not consider the quality good. Dyehouse is smaller, but is decidedly of better quality; I do not know which of the two is the earlier bearer.

Mr. Woolverton: Dyehouse is earlier with me than English Morello.

Mr. Caston: They are pretty nearly alike in season with me. I have tried the better kinds of cherries but none of them have survived and therefore cannot be recommended for planting in my section.

Q. Do not sour cherries pay better than the others?

A. I think they do. People are planting more of them at any rate.

Mr. Woolverton: Montmorency is one of the best sour cherries. Can you grow it?

Mr. Caston: The trees are growing nicely but have not fruited yet. As to susceptibility to black knot, all varieties seem to be affected more or less.

Q. Have you tried spraying as a remedy?

Mr. Caston: I believe that spraying on the bare trees with bluestone is a good preventive. It should be followed later on by Bordeaux mixture. The trees should be sprayed before the leaves come as after that it is very difficult to reach the spores. Instead of two pounds of bluestone in forty gallons of water, I use three.

Q. I have a large number of seedling cherries on my farm four or five years old. If I cut them off and allow shoots to come up, can I bud on the shoots?

Mr. Sherrington: I had some cherries girdled by mice. I sawed them off below the girdle and grafted to Morello and Bigarreau. They are now growing finely. At the time of grafting they were from one and a half to two inches in diameter.

Mr. Macoun: Cherries must be grafted before growth starts in the spring.

Q. Could you grow sour varieties satisfactorily on this seedling stock?

Mr. Macoun: Sweet cherries do well on sour stock and I think the reverse would be all right if you can graft successfully.

Mr. Sherrington, Walkerton: In my district we can grow cherries that are unsuccessful with Mr. Caston. I have twenty-five varieties in my experimental plot. During the last two winters we lost the majority of those in the Bigarreau and Duke classes and I would not recommend for our district any of the varieties in those classes. The varieties I rcommend are English Morello, Montmorency, Ostheim, Early Richmond. All these survived the recent severe winters,, but fruit buds were killed on Early Richmond and Montmorency. I consider English Morello the most profitable Morello the most profitable cherry we have. Dyehouse has not yet fruited cherry we have. Dyehouse has not yet fruited with me but promises well. It is an early variety and, I think, may be included in the list. As to spraying for black knot, I believe in spraying with bluestone alone early in the season before the buds burst. With reference to the failure of municipalities to enforce the law regarding black knot, in our district we have overcome the difficulty in this way; when our local Fruit Association was organized we petitioned the Council for an inspector. We had sufficient influence to get one appointed and to get the Council to see that he properly enforced the law. Black knot is rapidly disappearing in our section in consequence.

VARIETIES OF CURRANTS FOR PROFIT AND HOW TO GROW THEM.

By A. W. Peart, Freeman.

I have had a number of years' experience in the growing of currants. In regard to soil, a rich, moist, cool soil gives the best result. Where the soil is very fertile, satisfactory returns can be had among orchard trees. Shade is afforded in this way which is often beneficial, as there is less liability to sun-scald than when the bushes are planted in the open. This is especially true of red varieties. The best results are obtained from wide planting, the distance apart depending on the variety. As a rule, reds may be planted closer than blacks. For the average plantation six by six or six by seven is advisable. It is safer to plant in the spring than in the fall, unless the soil is naturally well drained. If the land is low and wet the plants heave, and are found lying on the surface in the spring because they have not had time to become established before winter caused growth to cease. I prefer planting early in the spring, and when the soil is reasonably dry. I never plant trees or bushes of any kind in the mud.

In regard to pruning, my practice is to prune in the spring, although I do not object to fall pruning if there is time. March is the best month. In red currants I thin out the old wood, and cut back the strong, young shoots, leaving sufficient cane to give a good crop. All wood over three years old should be removed, and, if the bushes are making vigorous growth, the three year wood may go, too. Red currants bear on two year old wood but the blacks do not. They are more inclined to bear on wood of the previous year's growth. For this reason they are not cut back so closely. I prefer the bush form to the tree form, especially where the currant borer is found, because in the tree form, if the borer attacks the stem, the whole bush is lost. I have divided the varieties I have tested into three classes, desirable, doubtful and undesirable. I find, however, that the varieties placed under these three headings differ greatly from year to year. Among the red currants there are two distinct classes of plants, one having a dark foliage, and the other a much lighter foliage. The lighter greens are, I find, the more rugged. In red currants I would recommend the following: Cherry, Wilder, Old Victoria, Prince Albert, North Star, Fay's Prolific. In black varieties, Naples, Saunders, Lee's Prolific and Collins' Prolific. Among the white varieties White Grape is productive, but White Imperial stands first on the list for quality. Among the doubtful varieties I would class Champion, New Victoria, Pomona, Red Cross. In undesirable varieties I include Belle de St. Giles as being the least productive of any of the red currants, also Brayley, which is small and unproductive. Raby Castle may, also, be classed as undesirable, being too small in the fruit, as are also Red Dutch and Versailles.

Q. Which is the largest of the black varieties?

A. I think Collins' Prolific. For some time the demand was poor, and prices for currants were low. The last year or two, however, has seen a change in this regard, and many growers have realized encouraging profits. With ordinary planting, twelve hundred bushes may be set to the acre. These should average three quarts per bush, which gives 3,600 quarts per acre. Recent prices have netted over three cents a quart, after paying for package and picking.

Mr. **Joseph Tweddle**, Fruitland: I think the tendency is to plant currants too closely. I have a plantation where they were originally set out six feet by four. Bushes have been removed until they are wide enough apart to permit a team to work between them. The result is that three times the crop has been realized. I am in favor of spring pruning. My experience with dark-leaved varieties is that, if pruned in the fall, they will die back very badly. I have found a great improvement in the growth and health of my bushes after I discontinued fall pruning.

Q. How long do you find it profitable to keep your bushes?

Mr. **Peart**: Not after they are eight or ten years old.

Mr. **Tweddle**: By planting ten feet apart and four feet apart in the row, you will have a thousand plants to the acre. I sow a cover crop just as in the orchard.

Q. Do you cultivate both ways?

Mr. **Tweddle**: No, only one. In regard to spraying currants, when our bushes were nine years old, and were beginning to die out, we sprayed them with lime and sulphur in the spring, and they became almost as vigorous as a young plantation. They were suffering somewhat from fungous growth.

HARDY FRUITS.

By Harold Jones, Maitland.

The question of hardy fruits cannot be discussed without due reference to locality. What may be a success in Northumberland and Durham may be an absolute failure east of Kingston. The thermometer does not show a great difference in temperature in the two sections, possibly three or four degrees, but there is the lake influence, which reaches much farther back through the Counties of Northumberland and Durham than we are perhaps aware of. A talk upon the various fruit districts of the Province would form a very interesting subject, but I must confine myself at present to the St. Lawrence Valley district, between Stormont and Cornwall. This is known as the Snow apple section. As the result of my experience as a fruit grower, running over a period of twenty-five years, during eight of which I have been engaged in experimental work, I may say that we still have to look for something better than the Snow, McIntosh, Scarlet Pippin and apples that are somewhat kindred to them according to parentage, such as Trenton. The first three are our leaders in that section. When parties come to me as an experimenter, I cannot conscientiously advise them otherwise than to stick to the varieties that are giving us the most money per acre, and, possibly, as much money per tree, as any other varieties we can plant. These varieties are all of pretty much the same season, and we now have to look for apples of commercial value which will extend the season through the winter. We have some valuable early varieties, such as Alexander, Wolf River, and the Baxter. These bring high prices, sell readily and export well. Trees of the Wolf River and Alexander are comparatively hardy, and may be classed as ironclads in the St. Lawrence Valley. Alexander will sometimes show a tendency to rot on the trees in individual instances, but, as a rule, the crop is picked in first-class condition, and is not subject to fungus or spot. The variety is readily attacked by the codling moth, but in our section we are particularly favored. In Western Ontario there seems to be one continuous brood from early in May till late in the autumn. We have two distinct broods, a spring brood, which appears shortly after blossoming, and a midsummer brood about the middle of July; between the two there is a distinct intermission. Therefore, if we give proper attention to spraying at the proper time in the season, we suffer but little loss from this pest. My experience, after fourteen years of spraying, is that if the work is done properly, after the blossoming period, not more than two per cent. of the apples will be found to have suffered injury from the codling moth. In the island of Montreal, Alexander is giving as good money returns as any variety they grow. Wolf River is a close second, and, possibly, may be a better apple, but we have not had it under test long enough to say. The trees of that variety planted in 1896 are showing up well, and the fruit will ship successfully till the end of November. Duchess is a standard variety which need not be touched upon; it does well in our section. Following these three varieties (I leave Astrachan out as not being profitable with us) we come to Wealthy. This variety fills the gap between Alexander and Snow. It is disappointing, however, in our section. Our soil is an alluvial one with a large percentage of clay, which makes it rather heavy. There are, of course, gravel ridges and some strips of lighter soil occur occasionally. Wealthy is subject to canker with us; the tree leans over very much from the prevailing wind; the fruit strips very easily, and does not attain size or quality, except in individual trees grown under favorable conditions. I have watched Wealthy very carefully in various sections when on Institute work, and have obtained specimens of the fruit in almost every month of the winter. My conclusion is that it grows to the best advantage on the slopes and depressions of the Laurentian hills, whch run through the province from the Georgian Bay, following the valley of the Ottawa, and crossing the St. Lawrence River at the Thousand Islands. In my opinion the soils of this Province may have more influence than climate on the quality of our fruit. In studying the geology of our country, we find that the range of hills I have referred to is composed to some extent of rocks that carry a high percentage of phosphates. My observation leads me to believe that certain apples, Wealthy for instance, possess far finer quality, texture, color and keeping qualities where grown on the slopes of these hills, because of the fact that the soils is rich in phosphates. I think this is a point that is worthy of further study. I am satisfied I am on a track of forming a basis in this regard on which we may work in the future in locating the best sections for certain fruits.

After Wealthy come our three leaders, Snow, McIntosh, and Scarlet Pippin. They all have defects, but all are heavy bearers, and come into bearing fairly early. All are subject to black spot. I heard the statement made a few years ago at one of the fruit meetings that Flemish Beauty pear could not be kept free from spot even if a sprayer were kept working continuously on the tree from spring to fall. My experience with it is that it can be kept free from spot easier than the Snow apple by proper and intelligent spraying done at the right time with sufficient force to give a mist spray, and not a drenching. You can secure from eighty to ninety per cent. of clean Snow apples, you will also obtain better sized fruit by keeping the foliage clean. There is still need of much missionary work in regard to spraying. In our locality we find people who will not spray because they have to use lime. They do not know how to handle it, and it clogs the nozzle and gives trouble generally. Trees should be sprayed twice, the last spraying coming about July first, after which the crop is practically assured.

The three varieties I have mentioned do not last longer than Christmas. They will keep longer, but the market demands certain varieties at certain seasons. The consumer is looking for these varieties now, and will continue to do so until about the third week in December; after that time winter varieties are in requisition. This is a point worth considering. The market for these varieties is very extensive, and we cannot grow enough to fill the demand for these apples in their season, but they must be in the consumer's hands by the first of January.

Mr. Kydd: What is the variation in season of these three varieties?

Mr. Jones: The Scarlet Pippin is slightly earlier, and should be picked first, because it drops easier than the others.

Mr. H. B. Cowan: The experience in the Ottawa Valley is that Scarlet Pippin keeps longer than either of the other two varieties.

Mr. Jones: Yes, but it loses its crispness and flavor. It is not a question of how long an apple will hold out, it is a matter of when it will bring the best price in the market,—that is the time to sell it. I think that the most valuable work before the Experiment Station for the East is to try to find a profitable winter apple, which will some in after the varieties mentioned. So far we have not got such an apple. Spy shows fair hardiness with us up to the time of full bearing. After bearing one or two full crops it begins to show defects, and dies off, and that, after taking from twelve to sixteen years to come into bearing. I imagined at one time that I was going to have something that would take the place of the Spy in the Ontario. I started in by planting 106 trees. I took care of them for four years, but after the freeze of 1903 I cut them all down.

Mr. Macoun: He would not take our advice. We had had experience with Ontario. That is where people make a great mistake. These Stations are for the purpose of testing the hardiness of apples, and the men in charge of them are there for the purpose of giving advice to the people of the district. If the people will take that advice they will often save themselves thousands of dollars.

Mr. Jones: Each year I have more people coming to me for advice on this subject.

As to Baldwin and Greening, it is definitely settled that they are not hardy in our section. I have Ontario, top grafted, which is just below an open wind break and escaped the freeze of 1903. I suppose the weakness of Ontario is due to the fact that the fruit bud is not properly matured in the fall, and that the cold winds destroy the vitality of the tree. Although we have not yet secured a profitable winter apple, I think the time is approaching when we shall do so. The most profitable winter variety we have is Golden Russet, but it wilts in ordinary storage and gives a slack package. It also loses its crispness and juiciness, and it is only at certain times in the year that Russets are A 1; after that they become second grade. Ben Davis attains neither size nor color; North West Greening has many good qualities, but lacks color, and, on that account, it has to take its place on the market with Rhode Island Greening.

Mr. SHERRINGTON: Is it subject to spot?

Mr. JONES: Slightly, but not as much so as the ordinary Greening.

Mr. SHERRINGTON: I would class it below Ben Davis for my district.

Mr. JONES: As to McMahon White, the chief point regarding it is that it is one of the best varieties I have found to top graft on. It has strong vitality, is perfectly hardy, and has one of the best crotches of any tree I ever saw. You cannot do better than use this variety, especially if you wish to bring an apple into early bearing. The next best variety to McMahon is Hibernal. Pewaukee does not compare with it and Tolman Sweet has not the same vigor. I find that that there is always a market for a good cooking apple, and the most promising variety we have of this description is Milwaukee. It has a sharp acid but no very decided flavor and is not, of course a table apple. It keeps its acidity and does not get flat. It is especially valuable in the western market and commands a price right through the winter. It should be remembered that more apples are sold for cooking purposes than for dessert, probably the proportion is ten to one. Another profitable cooking apple is Scott's Winter. It is a bright red and very hardy but has the fault of running small after the trees come into bearing. It is an annual bearer and a good yielder. It has a sharp acid and will keep its quality until June and is a first class cooker.

Q. Is there any reason why you should not have a first class winter table apple?

Mr. JONES: I do not know why we should not. We have cooking varieties that will hold their quality, and I see no reason why table apples should not be found which will do the same. Mr. Macoun is now engaged in hybridizing and crossing early winter varieties with our later keeping varieties, and I think we shall eventually secure what we require in this regard. The best varieties we now have originated largely from chance seedlings. McIntosh Red was of this description but it was one of a million. It no doubt resulted from a natural cross of two varieties. Mr. Macoun may be able to get one out of a thousand seedlings by intelligent crossing. He has a great work before him, and I hope he will live to see great results.

Mr. ROBERTSON, Lindsay: I have grown Phoenix very successfully. It is similar in appearance to Milwaukee.

Mr. JONES: I do not know it.

Q. Have you had any experience with Cooper's Market?

Mr. JONES: I have no trees of that variety as yet. I have about sixty-eight varieties and have mentioned only the most promising ones. I have a very long list of undesirable varieties. Salome was planted in 1896 and up to the present has grown three or four crops, but the fruit is absolutely worthless—it lacks size, is uneven in form and a poor apple in every way.

Mr. A. McNEILL: The Fruit Division at Ottawa is frequently asked to identify Phoenix. It looks not unlike Canada Red. Phoenix is one of the most profitable apples grown. When I say that, I do not wish to be understood as recommending its planting. It is no more profitable than Ben Davis. It is a good shipper, and if it had been universally planted years ago, so that large quantities could have been shipped, I think it would have been as profitable as Ben Davis. It is sweetish and insipid in quality.

The CHAIRMAN: Has anyone present had favorable experience with Salome?

Mr. McNEILL: I know of a most successful small orchard of this variety, owned by Mr. Zavitz, of Coldstream, Middlesex County. It should never be grown in the colder sections. I would not recommend it anyway as it is just an additional variety.

Mr. Sherrington: Our trees are doing splendidly.

Mr. McNeill: You will not get fruit of good size.

Mr. Jones: Mr. Huggard of Whitby unfortunately reported the variety as very desirable some years ago, but on further test it proved worthless for our section, and we must try to counteract the impression that has gone forth regarding it.

Q. How do you regard Baxter?

Mr. Jones: It is quite a profitable variety with us and may easily be classed as hardy. There is some tendency to sun-scald. Trees of sixteen to twenty years old yield from one to one and a half barrels and the price received is from $3.00 to $3.25 per barrel.

Q. What about Blue Permain?

Mr. Jones: It is a very handsome apple of midwinter class, and is of rather high quality as a table apple. It is a shy bearer, however. My trees are from thirty to thirty-five years old, and from two to two and a half barrels is an average crop, so that it is less than the Spy in yield.

The Chairman: We must keep in mind the fact that Mr. Jones is talking of varieties adapted to his district, where they require hardy apples. He is not discussing varieties for the warmer sections.

Mr. Reed: Delaware Red is quite as hardy as anything Mr. Jones has mentioned, and it is a good keeper.

Mr. Macoun: It is a hardy apple, but not sufficiently so for the district. We thought so until two or three years ago when we had an exceptional winter. We may not have another exceptional winter for twenty years, but if it comes along just as your trees are commencing to bear nicely and kills them out, your loss will be a severe one. We have crossed this variety with McIntosh Red because it is one of the best keepers we have. I have kept it in an ordinary cellar over two seasons. I would not add it to Mr. Jones' list. It is not sufficiently hardy, and the fruit is inferior in size, too much of it grading as number two.

Mr. Jones: That is the reason I spoke of Milwaukee, whose parent is Duchess. The tree takes care of itself, and does not require pruning. It does not grow a lot of extra wood for nothing, but is a business tree from the start. Besides this, it bears a high percentage of No. 1 fruit. It is practically free from spot. Keep away the codling moth and fertilize your trees, and spraying will be reduced to a minimum. The result will be a crop of high class commercial fruit with a small amount of labor and expense.

Mr. Robertson: Bellflower does well in our section.

Mr. Jones: We consider it one of our finest winter apples, but it does not meet with favor in the market, as its shape and color are both against it. It goes to the export market as Bishop's Pippin, but the Bishop's Pippin of Nova Scotia is superior to Bellflower. It seems that Paris green added to the soda Bordeaux mixture is very injurious to foliage, and I think this subject should be brought up for the benefit of Institute speakers so that they might be in a position to explain why this is the case.

Prof. Shutt, Ottawa: The soda Bordeaux mixture was recommended by the Provincial and Dominion authorities for use on potatoes. It was introduced by Institute speakers last winter, and considerable interest was taken in it. As it is much easier to make than the ordinary Bordeaux, people have used it for other purposes, and, as they have been in the habit of adding Paris green to Bordeaux, they added it in like manner to the soda Bordeaux mixture. In consequence of this much injury was done both in Ontario and Nova Scotia to foliage and fruit. The reason for the trouble is this: When Paris green is added to soda Bordeaux, arsenide of soda is formed. This is injurious to foliage, and cannot be used even in a very dilute solution. It does not injure potato foliage, however. We found from our experiments that it injures apples, plums and cherries, and, particularly, plums and cherries. Some varieties of apples were less affected than others, but all were affected more or less. There is another point in connection with the use of soda Bordeaux that should not be lost sight of, namely, that it has to be used within twenty-four hours of being made or it will become granular, and will not adhere to the foliage.

RASPBERRIES FOR PROFIT: VARIETIES, PRUNING, AND PLANTING.

By A. E. Sherrington, Walkerton.

Last year I recommended the following varieties in red raspberries, namely, the Reliance, Turner, Marlboro, Cuthbert, Phœnix. Loudon was also included in the list, but his was a mistake: it is not a satisfactory variety. I have a few changes to make in this list. I find that Reliance and Turner are too small for good market varieties, although their quality is excellent. Marlboro might also be improved upon as an early variety, as it does not make cane enough. Perhaps a cross between Marlboro and Cuthbert would produce a more vigorous plant and an earlier berry. Marlboro is a large berry of good color and a good shipper, but the fruit is dry and crumbly.

Q. Are there not two or three different kinds of Marlboro?

Mr. Sherrington: The difference is in the habit of growth, not in the berry. Herbert fruited with me for the first time this year. This variety was originated by Mr. R. B. Whyte, of Ottawa, and from one year's experience I have to place it at the head of the list. The plant is not so vigorous as Cuthbert, but is, I think, sufficiently so. It is the largest berry I have, being three-quarters of an inch in diameter as against half an inch for Cuthbert. Cuthbert still stands at the top of the list as the best all round berry grown. The first fruit of Cuthbert was harvested July 19 and it yielded 347 ounces by the middle of August, when the crop was over. It is a hardy and vigorous grower and the fruit is in great demand in all sections. The first fruit of Herbert was picked on July 17 and the last on August 11. In that time a crop of 665 ounces was taken off a twenty-foot row. The quality was fine, and it proved to be a good shipper. In Marlboro the season lasted twenty-nine days, beginning on July 13, and the crop realized was 330 ounces. Turner came in on July 11 and yielded only 257 ounces. The first Phœnix were picked on July 13 and the crop, which was concluded by August 13, amounted to 330 ounces. The fruit of this variety is small, but as a rule it is a regular and heavy yielder. The fruit is of good quality and I should not like to discard this variety.

Black raspberries have been a comparative failure recently owing to the work of anthracnose. Hilborn is the hardiest and best, but the fruit is small. Conrath comes in earlier, but is not so hardy. Older is perfectly hardy but the fruit is shiny black and lacks the characteristic bloom. It is not popular on the market on that account. It also has a very short fruiting period. During the past season the crop was taken off in four pickings extending from July 13 to August 1, and the quality is only fair. The yellow and white varieties are not needed in the commercial market. Golden Queen is perhaps the best of them.

Mr. Woolverton: Is not Brinckle's Orange of better quality?

Mr. Sherrington: But the plant is not as good. I have tested a considerable number of purple varieties. Columbian is the hardiest and the best yielder, but I prefer Schaffer, as it is of better quality. I can find no market, however, for purple berries.

Q. Schaffer is in demand as an early canner?

Mr. Sherrington: It is necessary to have the ground thoroughly cultivated and perfectly free from grass before setting out the raspberry plantation. Cultivation and fertilization are the two main factors in securing a good crop. I am very much in favor of spring planting as against fall planting. The plants should always be set deeply because the roots are surface feeders and they should be kept down as low as possible. The method I adopt in planting is to make a furrow with the plow and then turn out another along the same bottom. The bushes should be set in this trench and the roots well covered. Rows six feet apart give good satisfaction. The suckers are allowed to spread until a hedge row is formed thirty to thirty-six inches wide, a space of three feet is maintained between the rows. This system is convenient for working with a horse cultivator, and is especially adapted to plantations set out between the rows of orchard trees. A suitable arrangement is three rows of berries and the outside rows nine feet from the trees. When the tree rows are thirty feet apart this plan has been found to work satisfactorily. A fruit plantation requires plenty of fertilizer. Some growers rely solely on the commercial fertilizers. It is true that in this way weed seeds are avoided, but it also results in deficiency of humus and a compact surface soil. Shallow cultivation is necessary as the roots gradually come near the surface, and if the soil is cultivated too deeply, they are liable to be destroyed and the supply of nourishment cut off. A one-horse cultivator, which will work up the ground to a depth of two or three inches, used once a week or oftener in dry weather, will be found suitable. I do no summer pruning of raspberries, as the practice permits of the growth of late laterals and numerous suckers. If there is time, all the old wood is taken out in the fall. If not, this work is done in the spring after the fruit trees have been pruned. At this time, too, the canes are cut back. Great judgement is required in cutting back canes. In some cases the canes have made rank growth. If there is a sufficient number of buds low down, the canes can be cut back much more severely than if the buds are higher up. All canes that have been damaged by frost should be removed. The canes are thinned out so as to leave the strongest ones four to six inches apart. My raspberries, which were cultivated under the above method, yielded me last season from twenty-three rows, three hundred feet long, planted in a young apple orchard, about 3,600 boxes. These netted seven cents a box.

Q. What would be a good yield for an acre?

A. From three to four thousand boxes.

PEACHES FOR PROFIT: PRUNING AND WINTER PROTECTION.

By W. W. Hilborn, Leamington.

A larger and better peach is demanded by the market to-day than was required some years ago. The present demand is for a peach of large size, good color and fine quality. We should have varieties of this kind which would cover the entire season and we do not at present possess such varieties. We also require better shipping varieties in order that we may extend our business. The Elberta is perhaps our best peach. When grown to perfection it is very fair in quality, of good size, good color and will stand shipping well. It thrives best on high, dry, sandy soil, and the trees should be well thinned out to admit plenty of sunlight.

Q.—Is not the soil you mention the best kind for any variety of peach?

Mr. Hilborn: It is the best peach soil for color and quality. I do not think I should care to plant on any other kind of soil.

Q.—Have you ever seen Elberta grown on light gravel?

A.—I have grown it on such soil but the fruit does not obtain the same size.

Q.—If we were to draw the line as closely as you do in regard to soil, there would be very few peaches grown.

Mr. Hilborn: I suppose you cannot get that soil everywhere. The chief point is to see that the roots of the tree will not run down to water, or good results will not be secured in the quality and color of your fruit. We have fruited about 150 varieties, some quite extensively, but others only in limited numbers. The market demands a yellow peach. Very few white peaches are asked for even though the quality may be as good or better. White-fleshed varieties do not stand shipping well as a rule, and by the time they reach the market, they are usually in bad condition; but for my own use I prefer them. The following are the varieties I would recommend for my district: In early peaches, the Alexander and Greensboro. These are white varieties, as you cannot get a yellow peach of the same season. They produce a nice peach on suitable soils, but I would not recommend planting them in large quantities. Next come St. John, Early Crawford and Garfield.

Q.—Do you not find that Garfield ripens before Crawford?

A.—There is very little difference one year with another. Then come the following in order of ripening: Garfield, Fitzgerald, Prolific, Engle, Mammoth, Elberta, Gold Drop, Bronson, Kalamazoo, Smock, Banner.

Q.—Would you not include late Crawford?

A.—It does not bear well enough to be profitable with us.

Q.—Is not Kalamazoo a very small peach?

A.—Not with me.

Q.—Do you not include Sneed?

A.—No, because of its small size and poor color.

Q.—What do you consider the hardiest peaches?

A.—Those of the Crawford type, Fitzgerald and New Prolific.

Mr. Robertson, Lindsay: I grew Fitzgerald at Lindsay and exhibited the fruit at the Fall Fair two years ago, but the trees were killed the following winter.

Mr. Woolverton: What advantage has Fitzgerald over Crawford?

Mr. Hilborn: The trees produce younger, the fruit colors better, yields better and averages equally well in size. The tree is also a little hardier.

The Chairman: I observe that the list Mr. Hilborn gives us this year does not agree with last year's list.

Q.—What is Kalamazoo like?

A.—It most nearly approaches Gold Drop and is about the same size. The trees are inclined to over-bear and have to be thinned. As to pruning; very much depends on the pruning as to whether you will have large or small fruit. To secure good peaches, the trees must be properly pruned to admit sunlight throughout and the fruit thinned out sufficiently.

Q.—How high do you head your trees?

A.—From two to two and a half feet from the ground. In some districts they consider this too low to work under. If you head high enough for horses to pass under, it takes a long time to get a large crop, and even then you do not get as good fruit as with low-headed trees, and the latter are not so much affected by wind. The only disadvantage is in cultivating the orchard·

Q.—Do you both prune your trees and thin out your fruit?

A.—I like to prune the wood early in the spring and thin out the fruit as required. The difficulty in thinning peaches is that if we do it ourselves, we do not remove half enough of the fruit, and if we set someone else to do it, they do not discriminate between good and poor fruit. I aim to pick out small, ill-shaped fruit.

Q.—Is it not more profitable, under present labor conditions, to prune well with the shears and leave out the thinning?

A.—To get the best results trees should be thinned if they are overloaded, and you cannot always regulate it with the shears. To secure the best peaches, they should be thinned to four or five inches apart.

Q.—What would be the cost of thinning a twelve year old tree?

A.—One man should do it in an hour. I find if we thin down to what appears to be about half the crop, the money returns are better than if the trees are untouched.

Q.—If it takes an hour to thin a tree, how would you get sufficient labor to thin say four thousand trees?

A.—At the time I speak of we had twenty thousand trees and the work took from two or three weeks with from four to six men employed. We thought it paid us. The peaches have to be picked any way and labor is more readily obtained at the time of thinning than later on in the season, and less care is required to pick green fruit. Then, too, it costs as much in soil fertility to produce the pit of one peach as it does the flesh of three or four.

Q.—When do you begin to thin?

A.—As soon as the peaches are well set and large enough to work upon. My practice it not to thin too closely the first time, but to go over the trees quickly as it tends to prevent fruit from dropping.

Q.—Don't you think that much of the cost of the thinning might be avoided by judicious pruning and heading back the laterals? Do you practice heading back the laterals to a certain number of buds or do you thin out the main branches and let the laterals go?

Mr. Hilborn: I do not cut back the laterals.

Mr. Armstrong: I think you would save hundreds of dollars in thinning if you would use that method of pruning.

Mr. Hilborn: We try to thin at the time of pruning so as to leave the tree as nearly right as possible and then thin afterwards if required.

Mr. Woolverton: Do you think you will be able to successfully grow peaches in Essex by any method?

Mr. Caston: I think it could be done by grafting peaches on plum stock.

Mr. Hilborn: I have not tried it myself, but had the same idea, and I wrote to a number of parties across the line who had followed that method and they pronounced it a failure as the graft would not unite properly. As to winter protection, one of our difficulties is that our best peach land is high, dry, sandy soil. On land of this kind if we get a winter without any snow and long continued cold, the frost enters sufficiently into the ground to kill the roots while the tops remain uninjured. We have tried a number of cover crops without very satisfactory results. On our soil we must cultivate till about the first of August, and if we sow a cover crop after that time, we cannot get sufficient top to give protection; or if we do get a fair crop, we do not get it immediately around the tree, where it is required, as it will not grow there with sufficient vigor.

Q.—Would not rye answer?

A.—It is perhaps as good as any but does not give sufficient cover. Next year we intend to grow early tomatoes among the trees and after they are through, by September 1st, we shall take the vines and pile them around the trees covering them with a little earth.

Q.—Are you troubled with mice?

A.—We have no mice. If we keep our fences clean and cultivate our orchards, mice do not trouble us.

Q.—Would not sawdust be useful in this connection?

A.—It sours the soil and some growers claim that two or three applications will kill the trees.

Q.—How do you treat borers?

A.—We hunt them out in the spring and destroy them. We also apply a mixture consisting of one bushel of lime, one bushel hard wood ashes, one pint crude carbolic acid, with sufficient water added to form a cream. After the borers are picked out in the spring, this is applied from the roots to the limbs.

Mr. Jones: We use linseed oil on apple trees with good results.

Mr. Woolverton: The apple tree borers work only in summer time, and a little soft soap will keep them away.

REPORTS OF EXPERIMENTERS.

APPLES.

NOTES BY W. H. DEMPSEY, (*Bay of Quinte Station*).

The apple crop was very light in this district this year, there being not more than one-third of a crop. There are several reasons for this. The trees may not have recovered from the effects of the severe winter of 1903. Some that were in an unhealthy condition last year have died this year, and many individual limbs which bore heavily in 1903 have died this season, while the remainder of the tree is apparently sound. Again, the cold foggy weather at the time of blooming may have lessened the crop for only those not in full bloom at that time were heavily loaded. The codling moth, which was very numerous, has also tended to lessen the crop by causing so many apples to drop. The curculio also had a share in the destruction of the crop by causing in many orchards many barrels of apples to become ill-shapen and unfit for market.

There was very little spot on the apples, and only in locations favorable to it, where it appeared late in the season.

The fungus on the foliage did considerable damage by causing it to turn yellow and drop in August and September, which left the wood unripened for winter, and the fruit exposed to the sun to ripen prematurely. This was most noticeable on the Baldwin, Stark, King, Seek, Fameuse, Greening, Russett, and Ben Davis.

COO'S RIVER BEAUTY is improving each season; it bore a fine crop again this year which hung to the tree until the first of November, with very few windfalls. At present it appears to be one of the most promising of the new varieties which I have; quality good.

BOIKEN is still maintaining its good fruiting qualities, and the fruit is of good size.

MILDING: Planted in 1896; a very vigorous grower, making large handsome trees; requires but little pruning; tree spreading, has produced very little fruit; evidently requires age before fruiting. Fruit, large, striped and splashed with red; medium quality.

ROME BEAUTY: Fruit running much smaller; tree not a vigorous grower, looks as though it were becoming unhealthy.

SUTTON'S BEAUTY: Planted 1894; still making very little growth; bore only a few specimens this year. It is too weak a grower and too slow in fruiting to be of value here; possibly it might do better top grafted on good stock; have not tried it.

SHIAWASSEE BEAUTY: Planted 1894; has made slow growth, producing good crop each alternate year; this year nearly one barrel of mostly XXX fruit; fruit good size, color and quality; excellent for cooking, and dessert; season, October and November.

YORK IMPERIAL: One year old, planted 1898, made medium growth, handsome tree, heavily loaded this year for the first, has a far more promising appearance than the scions top grafted on yellow Bellflower in 1897, which have borne only a few specimens. The fruit is handsome, light red; keeps good till spring, medium quality.

NOTES BY HAROLD JONES, (*St. Lawrence Station*).

My notes on 22 varieties published in the Report of 1904, do not need repeating. The following varieties fruited with me this year.

AKEN'S RED: Planted 1897; yielded a fair crop of medium sized, dull red apples, of no special value; fruit subject to fungus spot.

DOWNING'S WINTER MAIDEN'S BLUSH: Planted 1896; bore a crop of about 15 apples; fruit large, similar to Maiden's Blush in color and markings; a handsome apple of promising appearance.

GANO: Planted 1900; a few specimens similar in size and form to Ben Davis; a handsome deep red apple; promising.

HURLBUT: Planted 1896; yielded a good crop of rough uneven fruit of no special value; not desirable.

MAGOG RED: Planted 1896; bore a fair crop of large yellow fruit faintly streaked; quality medium to poor; does not hold to the tree well; not desirable.

MILDING: Planted 1897; a vigorous healthy tree; yielded a few specimens of large, smooth apples of attractive color; worthy of further trial.

NORTH WEST GREENING: Planted 1896; bore good crops for two years; fruit large, green with color in some cases; a fair cooking apple; tree vigorous and hardy; worthy of further trial.

ROME BEAUTY: Planted 1898; tree healthy and vigorous; fruit large and attractive; worthy of further trial.

SWITZER: Planted 1897; a vigorous, hardy tree coming into bearing young and giving heavy crops; fruit medium size, attractive in color; follows Astrachan in season; drops on reaching maturity, and does not sell as well as Duchess; not desirable here, but might take the place of Astrachan in Northern sections where that variety does not succeed.

WOLF RIVER: Planted 1896; a hardy vigorous tree; a fair cropper; fruit large, handsome; resembles Alexander; meets with a ready sale at good prices; a month or six weeks later than Alexander; an all round desirable apple worthy of more extended trial.

YATES' RED: Planted 1897; a poor, weak grower with no vigor; fruit small, red, of no value; undesirable.

NOTES BY G. C. CASTON, (*Simcoe Station*).

ALEXANDER: I think this apple has come to stay as one of our list of fall apples; perfectly hardy; a good bearer; fruit large, handsome and a first-rate cooker.

WOLF RIVER: About a month later in season than Alexander, in fact it keeps fairly well until Christmas. Tree a real ironclad in hardiness, thrifty, prolific; fruit very large and highly colored, handsome and a first-rate cooker.

COLVERT: This apple still retains its place as a good shipper among our fall apples.

For a rotation, beginning with Duchess, the Peerless would come next; then Alexander, and next Colvert, Wolf River and Blenheim. This would probably be the best list for profit and to cover the season until winter apples are ready to ship.

SNOW, MCINTOSH and WEALTHY are unsatisfactory and give but a small percentage of first-class fruit.

In winter apples, if I were to add any to the list given in former reports, it would be the

BOIKEN: While not of high quality, it is a good cooker and keeps as well as Ben Davis; it is clean skinned, and colors fairly well here; the tree begins to bear almost as soon as planted and keeps right at it every year; so it could not fail to be profitable. Its color might be against it as an export variety, but it would be all right for the home market, especially in view of its great keeping qualities.

Among the list of undesirable varieties of apples fruited here, I might mention nearly all of the Russians; Scott's Winter, a small, sour scrub. I would consider myself in a bad plight for winter apples if I could grow nothing better than Scott's Winter.

WALBRIDGE: Another worthless scrub, should never have been propagated.

HAAS, OR FALL QUEEN: Highly colored and handsome; hardy; but of very poor quality.

GIDEON: Healthy, hardy, prolific, but rots at the core and the tree, like Wealthy, has a tendency to overbear and the fruit to run small.

BARRY: About as useless a variety as was ever sent out.

HASTINGS. Worthless here.

SCARLET PIPPIN. Too small to be of any use and scabby at that; no larger than some of the crabs; worthless here.

RIBSTON PIPPIN: Blooms profusely, but never yields a full crop.

MAGOG RED STREAK: Poor stuff; should never have been propagated.

COOPER'S MARKET: Poor bearer; fruit small. If there is anything to commend it elsewhere, it must be out of its latitude here.

HAMILTON: An early fall variety; color against it; nothing to commend it.

SUTTON'S BEAUTY: No use here.

FANNY: A worthless scrub.

CLAYTON: Little better.

MONTREAL PEACH: A yellow apple; nothing to commend it.

BLUSHED CALVILLE: One of the most worthless ever tried.

WINTER ST. LAWRENCE: Not favorably impressed with it; may be worthy of further trial.

YORK IMPERIAL: Too tender here; might do, top-grafted.

WINTER MAIDEN'S BLUSH: This variety is worthy of further trial; it may have a place as a winter variety. The tree is a hardy, thrifty grower and the fruit is clean and fairly attractive, and I would not condemn it without further trial. However, I feel that it is not wise to add anything to the list of winter varieties unless possessed of highly commendable qualities, commercial value being of first importance.

NOTES BY A. W. PEART, (*Burlington Station*).

The following varieties were top-grafted last spring on a Roxbury Russet tree:—Baxter, McIntosh, Princess Louise, Wolf River, York Imperial; southern apples, Apple of Commerce, Black Ben Davis, Collins' Red, Dyer, Olivet, Rengen Red, Richardson's Russet.

Southern varieties which this year fruited for the first time are:—

BONUM: Top-grafted 1901; fruit very small, red.

MALINDA: Topgrafted 1901; fruit medium size, very fine skin, toplike shape, very perfect and symmetrical, red in color.

SWAAR: Top-grafted 1901; fruit red, medium size.

These three varieties appear to be late keepers.

NOTES BY CHAS. YOUNG, (*Algoma Station*).

The crop of 1905 in Algoma has been an excellent one, and sold locally at remunerative prices; perhaps the best apple crop we ever had. Fall fruit we can always depend upon, but this year winter fruit, owing, no doubt, to favorable weather, did splendidly. Just here on St. Joseph Island we have gotten past the stage of doubting whether fruit can be grown at all or not; we know it can, and are planting more every year and with good results, now that we know just what to plant. Eastern nurserymen have kept back fruit-growing in the north by unloading unsuitable stuff upon us; in fact, this seems to have been a dumping ground for what could not be sold at home, and many thousands of dollars have been paid for stuff sold by a highly colored picture which we never hear the name of. We are not just quite satisfied yet, although our fall apples will keep much longer than the same grown in the east. We are still looking and trying to get something nearer perfection and a long keeper. Scott's Winter is more extensively grown as a long keeper than any other, but is by no means a perfect apple. It wants clean cultivation, good rich ground, or else the fruit runs small. The demand here is for a larger apple. Then, for the grower, it does not yield enough to the tree, and even with clean cultivation, etc., we cannot grow the fruit to compare with that shown at the F., F. and H. Show in Toronto in November, 1904. With fall fruit it is different; we can hold our own with any part of Ontario. Walbridge will keep late into spring and is a profitable apple to grow, but the quality is poor; we hope in time to be able to grow something nearly up to your Spy.

I had a number of winter apples top-grafted, expecting to get something. In fact, I had stuck on everything I could get with the name of winter attached, but unfortunately upon Tolman stock, which proved too tender for the winter of 1903-4. Had I used Longfield, McMahon, or Gideon as stock most would have been safe, as these are proof against sun scald. Just here I may say that I have found by experience that growing a tender top on a hardy stock does not necessarily make that top any hardier; that is, that top will not stand any more frost, or drying wind, in winter than when grown on its own root. It cost me some work and took some years to be convinced, but I am now satisfied that it is so. But, by top working on a stock proof against sun scald, we go a long way in overcoming our greatest difficulty here. We have received an importation from the east that I do not like as yet; they are very few, only half a dozen, and confined to one tree—I mean the Codling Worm. I will watch that tree very particularly, you may be sure. It is now five years since my experimental orchard was started here; 2½ acres was set aside for the work, which was then planted with some stock that I had very little hope for. Now it is a good object lesson; some trees having a circumference of top of 30 feet, such as Wolf River, Princess Louise, etc., while just alongside a little decayed stub, very little bigger than when it came from the nursery, probably Sweet Bough or Blenheim, and that replanted, is to be found. Nature study is good in its place, but as that experimental plot lies just alongside the road, I am tired studying nature just here, and propose to fill up that empty space with something that I know will grow, if for no other reason than to keep up appearances, moving the experimental plot farther back, where I have already made a beginning on a piece of excellent ground.

NOTES BY J. G. MITCHELL, (*Georgian Bay Station*).

In apples I have nothing new to report. What new varieties have been added to our list are not in bearing yet. In the Georgian Bay district Spy, Baldwin, Mann, Golden Russet, and Ben Davis are strictly winter kinds and the only ones which are stored for long keeping. For early winter R. I. Greening, King, and Snow, if they could be grown clean. Wealthy is taking the place of Snow to some extent here. The most desirable autumn varieties are Gravenstein, Twenty-ounce Pippin, Ribston and Blenheim Pippin.

The above are about the only apples that are asked for in car lots. Ninety per cent. of all the enquiries we get are for Spys in carload lots, which clearly proves the Spy to be not only the most popular but the best apple grown. Only a few days ago we had enquiries for fifty thousand barrels of Spys, while the same people would not buy anything else we had in store. To be sure, we have other good varieties, but the above list is sufficiently large and also the greatest money makers out of some two hundred varieties grown in this section of the country. The Golden Russet, if well grown, is one of the best export apples, but requires strong rich soil.

Of Ben Davis probably there are enough planted for some time, as nine-tenths of all the apple trees planted in the last eight years have been Ben Davis.

BLACKBERRIES.

Notes by A. W. Peart, (*Burlington Station*).

The blackberry crop was fair, hardy varieties yielding an average crop, while the more tender gave but few berries. Prices ranged from 7 to 10 cents per quart, according to size and quality of the kind. Young canes made a good growth, and were practically free from any disease. Yield is based on the average per bush or hill of variety.

Agawam: Planted 1901; hardy, vigorous and fairly productive; fruit medium size; yield per bush or hill, ¾ quart; season medium.

Ancient Briton: Planted 1901; hardy, vigorous and very productive; fruit medium; season early to medium; yield per bush, 1½ quarts. This is a very promising berry.

Dorchester: Planted 1901; a vigorous but tender grower, and poor cropper: fruit large; season early to medium; yield per bush ¼ quart.

Early Cluster: Planted 1901; vigorous, but tender and unproductive; no fruit; frozen to snow level.

Early Harvest: Planted 1901; medium vigor; tender; no fruit; frozen.

Early King: Planted 1901; moderately vigorous; no fruit; frozen.

Eldorado: Planted 1901; medium grower, hardy and fairly productive; fruit medium; season medium; yield ½ quart per bush.

Erie: Planted 1901; fair grower, somewhat tender; season medium; fruit medium to large; yield ½ quart per bush.

Gainor: Planted 1901; strong grower, but too tender; no fruit; frozen.

Humboldt: Planted 1902; medium grower; no fruit; frozen.

Kittatinny: Planted 1901; a very strong grower, but a little tender; injured by the winter; season late; fruit large to very large; yield ½ quart per bush.

Lovett's Best: Planted 1901; a stiff, upright but tender grower; fruit medium size; season medium to late; yield ¼ quart per bush.

Maxwell: Planted 1901; a very spreading, weak grower; too tender; no fruit; frozen.

Minnewaski: Planted 1901; strong but tender grower; fruit medium; season early to medium; yield ¼ quart per bush.

Ohmer: Planted 1901; a vigorous but tender grower; fruit very large; season medium; yield ⅛ quart per bush.

SNYDER: Planted 1901; strong hardy grower and very productive; fruit medium; season early to medium; yield 1⅛ quarts per bush.

STONE'S HARDY: Planted 1901; strong, hardy grower and fairly productive; fruit small to medium; season medium; yield ⅔ quart per bush.

TAYLOR: Planted 1901; moderate grower, hardy and productive; fruit medium to large; season medium to late; yield ¾ quart per bush.

WACHUSETTS: Planted 1901; fair grower, hardy, but not very productive; fruit medium size; season medium to late; yield ¼ quart per bush.

WESTERN TRIUMPH: Planted 1901; strong, hardy grower, and very productive; fruit medium size; season medium; yield, 1 quart per bush.

WILSON'S EARLY: Planted 1901; a strong, spreading, but tender grower; fruit large; season medium; yield ¼ quart per bush.

WILSON'S JUNIOR: Planted 1901; strong vinelike grower, but too tender; fruit large to very large; season medium; yield ⅛ quart per bush.

NOTES BY G. C. CASTON, (*Simcoe Station*).

AGAWAM and ELDORADO are the two best varieties for this section. Agawam is hardier than Eldorado, and I would give it the preference. This year it did the best. Neither of those varieties suffered the loss of any bearing wood up to the winter of 1903-4. That year, had it not been for the deep snow, there would have been no wood left alive, Eldorado being injured the worst. This variety was injured again last winter, although the lowest temperature was about 24 degrees below zero. Here again the use of nitrogenous fertilizer is certainly wrong, and the use of a manure with a high percentage of potash and phosphoric acid and low in nitrogen is indicated, as having a good deal to do with the ability of plants to stand the effects of excessive cold.

NOTES BY CHAS. YOUNG, (*Algoma Station*).

I cannot report much success with this fruit. I can see now that they were planted in an unfavorable location, and they behaved so badly that perhaps I did not give them the attention they deserved.

This spring I have planted out a new patch on what I think much more suitable ground, a few of each kind, enough to experiment with; twelve varieties in all. Eldorado and Agawam, so far, are apparently the hardiest, but all have been unsatisfactory. I would not recommend any one to plant them in Algoma with any expectation of paying for the trouble. The canes are too stiff to lay down; if they are left standing they are frozen; if topped in the late summer heavy snow strips off the side shoots. I don't want a berry that needs covering in winter. I have twelve varieties under test.

The three new ones received and planted this spring have made a good growth.

CHERRIES.

NOTES BY LINUS WOOLVERTON, SECRETARY FOR ONTARIO FRUIT STATIONS.

Perhaps never was there a more unfavorable season for cherries than that of 1905. Constant rains with variations of cold and heat, developed rot so rapidly that many varieties of sweet cherries were not worth gathering. Tartarians that were in perfect condition apparently, when shipped, were opened out at their destination the following morning a mass of rot. Napoleons that were in perfect condition one day and promised 20 or 30 baskets of magnificent stock to a tree, were the next day worthless and not considered worth picking. The Dukes were nearly all rotten as soon as ready for picking. Of the black cherries, the one least affected with rot, was Knight's Early Black. The Windsor was worthless near the Mountain, but in the open field it was much freer from rot; orchards that were sprayed, however, were comparatively clean, and no cherry is finer, or more desirable, as a sweet dessert cherry for either home use or market.

The APHIS was not at all troublesome this season, perhaps because of the frequent rains. The following are some brief notes on varieties tested on my grounds:

VARIETIES.

CHOISY is a sweet Duke, delicious flavor. The tree is upright in habit and vigorous. One of the trees is dead, without apparent cause. The crop this season was very light. Season 10th to 15th July.

BLACK EAGLE: Tree vigorous, and grows to a very large size, but is not productive; sweet cherry class. Fruit heart-shaped, large, almost black, and of the very highest quality for dessert. Not profitable. Season, 10th to 15th July.

BLACK TARTARIAN: Tree upright, spreading; vigorous; fairly productive. Fruit large, black, heart-shaped, delicious. Season July 8th to 15th. Unprofitable this season on account of rot.

CLEVELAND: Habit round spreading, fairly upright head; a fairly vigorous grower, yield very small this season. Fruit a white oxheart of very fine quality, if anything superior to Governor Wood.

COE: Tree round spreading; sweet cherry class; very vigorous; yield very good, but not firm enough to ship well. Season July 7th to 14th.

DYEHOUSE: Kentish; round head; fairly vigorous; very productive; yield this season quite as large as Richmond; ready last week in June, and gathered July 5th.

EARLY PURPLE (*Prunus avium*): Sweet Cherry class, and well deserves its botanical name, for it is more eaten by birds than any cherry. The cherry is good if fully matured, but the birds will not allow this, unless protected by nets. It was not profitable; indeed, after counting cost of picking, baskets and sale, it was harvested at a loss. Season, the first ripe cherries were about June 14th, at which time ¼ were rotten, ¼ eaten by birds, and ¼ blasted. Had all remained good, there would have been a very heavy crop. Harvested June 20th.

EARLY RICHMOND: The staple early pie cherry of Ontario. The tree is not quite as vigorous as Montmorency, nor quite as productive. The fruit is smaller than Montmorency, and it ripens earlier. Season last of June. Harvested first week in July this year.

ELKHORN: A vigorous upright, spreading tree, very productive alternate years, and sometimes annually. A Bigarreau that contests the first place for profit with Windsor. The fruit is smaller than Windsor, but in some soils much less liable to rot; black when fully ripe. Season 15th to 20th July. A profitable variety.

ELTON: Upright spreading in habit; productive, but fruit is too soft to ship well, and was not profitable. Season July 5th to 10th.

EMPRESS EUGENIE: Habit upright; class Duke; vigorous and hardy; fruit rather small, and, like May Duke, subject to rot in unfavorable seasons. Not profitable this season.

ENGLISH MORELLO: Tree of roundish habit; inclined to blight this season and cherries to blast; crop small; harvested last of July or beginning of August. Not as profitable this season as Montmorency.

Governor Wood: Habit round spreading; very vigorous, trees forty years planted still vigorous and productive; small crop this season; not as profitable as in other years. The best early white oxheart. Harvested June 22nd to 27th, 1905; 63 quarts from a ten-year-old tree.

Grenner Glas: Tree of Duke habit, but cherry much like Kentish; upright, vigorous, and productive; cherries grow large in clusters; harvested July 13th.

Knight's Early Black: Tree very vigorous, healthy and productive, a forty-year-old tree now thirty feet in height, with proportionate width.

Late Duke: A very upright vigorous grower; fruit very large and hangs in great clusters. Harvested July 15th, was most profitable of the Duke cherries this season (1905).

May Duke: Very upright in habit, very vigorous, and very productive; branches slender, brittle; fruit medium in size, excellent for pies because not too acid; fruit rather tender for shipment and ripens unevenly, therefore not a first-class market cherry; deserves a place in every garden for home use. Season June 15th to 30th. Not profitable this season.

Mezel: Tree upright, spreading, very vigorous and productive; Bigarreau class; fruit on healthy trees very fine, large and showy, reddish black color and very firm. Season last half of July along with Windsor and Elkhorn; does not equal the Windsor when latter is well grown and rot free.

Montmorency: Tree Kentish, round head, willowy, fairly vigorous, hardy, very productive most seasons, but this season half the trees gave a light crop; cherry larger than Richmond. Season July 15th to 20th, 1905; the best pie cherry grown, as well as the one most reliable for profit.

Napoleon: Tree Bigarreau, spreading habit, very vigorous, very productive; fruit of immense size, the finest white Bigarreau, in dry seasons the most profitable white cherry; this season not worth harvesting on account of cherry rot.

Ohio Beauty: Tree upright, symmetrical, vigorous, very productive, a nine-year-old tree gave 24 quarts worth 7 cents each; cherries large, white, red cheek, very tender, juicy, sweet, delicate, too tender for distant shipment. Season June 25th to July 5th.

Orel 28: Round head, very hardy; succeeds at our St. Lawrence station; productive; fruit rather small. Ripens 10th to 15th July; valuable for cold sections.

Purity: Tree Kentish, vigorous, very productive, worthy of a visit when it was ready to gather, about tenth of July; cherry of good size, subacid, almost sweet, perhaps the best of its season. Season 1st to 10th of July.

Reine Hortense: Tree Duke, upright spreading, vigorous, stout, usually productive, this season a failure, yielding only a few specimens; cherry large, color light and dark red, excellent for dessert or cooking, too soft to be a profitable shipper.

Rockport: Fruit all destroyed with rot.

Royal Duke: Tree Duke class, very upright, fairly productive; fruit not equal to that of Late Duke. Season 1st week in July.

Russian 207: Tree Morello, vigorous and productive; fruit small to medium; dark red with a long stem and colored juice, quality fair, good for cooking, worth 75 cents an 11-quart basket in 1905, the same as the Kentish Pies. Season July 10th to 20th.

Schmidt's Bigarreau: An upright-spreading grower, very vigorous, a scanty bearer; fruit very large and fine; one of the best for dessert; a failure this year. Season July 10th to 20th.

Windsor: Tree Bigarreau, the most vigorous in the experimental plot, very productive; fruit very large, dark red, becoming almost black, flesh meaty, rich, excellent, but subject to rot. Season July 15th to 25th.

Wragg: A failure.

Yellow Spanish: Tree Bigarreau, spreading, very vigorous, making an immense tree; fruit yellowish white, firm, rich and excellent, but sadly subject to rot; a failure this season; seldom profitable.

Vladimir: A failure.

Koslov-Morello: A failure this season.

Habit of growth and vigor of trees on Maplehurst Fruit Farm. Scale of points from 1 (lowest) to 10 (highest.)

Variety.	Class.	Habit.	Vigor.
Abbesse		Round head	9
Choisy	Duke	Upright, spreading	8
Belle Magnifique	Duke	Round head	6
Black Eagle	Sweet	Upright, spreading	9
Black Tartarian	Sweet	Upright, spreading	8
California Advance	Duke	Very upright	8
Cleveland	Sweet Heart	Round, spreading	7
Coe	Sweet	Round, spreading	8
Connecticut Black Heart	Sweet	Spreading	7
Dikeman		Very spreading	7
Kranien Kursch		Upright, spreading	10
Dyehouse	Kentish	Round head	5
Early la Maurie		Upright,	10
Early Purple	Sweet	Upright, spreading	8
Early Richmond	Kentish	Round head	4
Elkhorn	Sweet Bigarreau	Upright, spreading	9
Elton	Sweet Heart	Upright, spreading	9
Empress Eugenie	Duke	Upright, spreading	8
English Morello	Morello	Round head	5
German Ostheim	Morello	Round head	4
Governor Wood	Heart	Round, spreading	9
Grenner Glas		Duke habit, upright	8
Griotte du Nord	Morello	Round head	5
Ida		Upright, spreading	10
King's Amarelle	Kentish	Round, compact	9
Koslov	Morello	Bush	2
Knight	Heart	Round	7
Late Duke	Duke	Very upright,	9
Love Apple		Spreading	6
Lutovka	Morello	Upright	8
May Duke	Duke	Upright	9
Mezel	Bigarreau	Upright, spreading	10
Montmorency	Kentish	Round	6
Mazzard	Sweet	Upright, spreading	10
Napoleon	Bigarreau	Spreading	9
Olivet	Duke	Round	7
Orel	Kentish,	Round, spreading	6
Purity	Kentish	Round, spreading	7
Red May		Upright	7
Reine Hortense	Duke	Upright, spreading	9
Rockport	Bigarreau	Upright, spreading	10
Royal Duke	Duke	Very upright	9
Russian 207	Morello		8
Schmidt's Bigarreau	Bigarreau	Upright, spreading	10
Schatten Amarelle		Round, slender	6
Spate Amorelle		Round head	5
Strauss Weichsel		Round head	7
Suda Hardy	Kentish	Round head	5
Windsor	Bigarreau	Upright, spreading	10
Wragg	Morello	Spreading	5
Yellow Spanish	Bigarreau	Large spreading head	10
Ostheim		Round, slender	5
Vladimir	Morello	Round	3

NOTES BY G. C. CASTON, (*Simcoe Fruit Station*).

I see no reason to make any change in the list given in my last report. The winter of 1903-4 killed several of the most tender kinds, and gave the others a severe trial from which they had not entirely recovered this year so that the crop was so small as to amount to almost a failure. Most of the trees bloomed well and set a large quantity of fruit, but it fell off quite early soon after it was nicely formed. This I attributed to the shock given the trees by the excessive cold of the winter of 1903-4.

Two of the most troublesome pests in connection with cherry growing are the black-knot and the robins. Whether the good done by the latter in the number of insects they destroy compensates for the amount of fruit they devour, is with me still an unsolved problem.

NOTES BY A. E. SHERRINGTON, (*Lake Huron Station*).

EARLY PURPLE: Tree vigorous and fairly hardy, but the birds take the whole crop before it is ripe, so I cannot report as to quality or yield. I shall dig out the trees.

EARLY RICHMOND: Tree vigorous and hardy; fruit, medium; color, red; quality, very good, but the birds got nearly all of the crop.

ENGLISH MORELLO: Tree, not so vigorous as some, but hardy and a good bearer; fruit, large; color, dark red or nearly black, colored juice; yield per acre, five baskets; a valuable market variety.

EMPRESS EUGENIE: Tree, vigorous and hardy, belongs to the Duke class; fruit, large; quality, good; will make a good commercial variety.

DOWNER'S LATE: Tree, vigorous and hardy; fruit, large; color, black; flesh, firm; quality, good; a good late variety.

DYEHOUSE: Tree, a good grower, of the Morello class; fruit, ripens earlier than the Richmond; color, red; quality, good, but the birds took the whole crop.

ELKHORN: Trees all killed by frost.

LATE DUKE: Tree vigorous and fairly hardy; fruit, large; color, dark red; quality, good; one of the best of its class for this district.

MONTMORENCY: Tree, vigorous, hardy; fruit, medium to large; color, red; quality, good; flesh, very firm; yield per tree, two baskets.

MEZEL: Tree, vigorous, half hardy; fruit, large; color, black; flesh, very firm; quality, good.

OLIVET: Tree, a good vigorous grower, and hardy; fruit, large; color, red; quality, good, flesh very firm; yield per tree, two baskets.

OSTHEIM: Tree, a moderate grower, hardy, and a regular bearer; fruit, medium; color, nearly black when fully ripe; quality, good; yield per tree, five half baskets.

REINE HORTENSE: Tree, rather tender for this district; fruit, large; quality, good; color, reddish purple.

WRAGG: English Morello under another name.

YELLOW SPANISH: Tree, a good grower, half hardy; fruit, large, color, yellow; quality, good; yield per tree, one basket.

NOTES BY HAROLD JONES, (*St. Lawrence Station*).

My report on cherries for 1905 is rather more encouraging than for any previous year since planting for experimental purposes.

The BIGARREAU and DUKE cherries have both proved unsuitable to this climate, and it is useless to experiment further along this line, but the

Morellos, Kentish and Russian cherries give promise of being hardy and giving fair crops in favorable years.

ENGLISH MORELLO: Is fairly hardy, though not entirely so; it comes into bearing at an early age and gives good crops. Some years the fruit buds are partly injured by frost, but 24 below zero does not injure them if the cold is not of too long duration.

EARLY RICHMOND has not done well with me, not being planted on suitable soil: on sandy loams it is hardy and prolific, but the birds destroy the crop as fast as the fruit gets color.

MONTMORENCY: Tree hardy and healthy; fruit buds tender and injured most winters. This year I had a fair crop of fine fruit. The tree gives promise of living longer than the English Morello.

OREL: This variety came to me with the label lost, but from the character of the tree and fruit I am satisfied as to the correctness of the name. Tree, hardy and vigorous, heavy bearer, and fruit buds the hardiest of any variety I have planted. Bore a full crop of fruit this year; a good pie cherry.

OSTHEIM: Tree, vigorous, healthy and hardy, but a very shy bearer, and unless its bearing habits improve as it gets aged it is not worth planting here.

OLIVET: Tree, fairly healthy, but fruit buds are killed every year.

VLADIMIR: A hardy, healthy tree, but shy bearer of small fruit of low quality; of no value.

NOTES BY W. H. DEMPSEY, (*Bay of Quinte Station*).

EARLY RICHMOND produced a fine crop of fruit which found ready sale at good prices in our local market. It is by far the most profitable cherry for this district.

MONTMORENCY produced a fine crop which, unfortunately, matured in foggy weather and nearly all rotted on the tree.

NOTES BY CHAS. YOUNG, (*Algoma Station*).

This may be disposed of by stating that the sour cherries are profitable here.

EARLY RICHMOND, MONTMORENCY and ENGLISH MORELLO will fill the season. It is between the two last which is the most profitable to grow. If I were buying the fruit I would prefer by all odds Montmorency. Orel seems to be a good cherry, but I have only one tree to judge by. Morello Fouche is too small, but bears immense crops; a fine preserving cherry. Ostheim has never given me a full crop and the tree is half dead. I have found Montmorency just as hardy as any of the others. It is no use to try to grow sweet cherries here; the tree may live for a few years, but will surely die before it produces any fruit except a few which the birds will claim.

A few Dukes were planted last spring, but the trees were two years too old when taken from the nursery and many are dead.

I have twelve varieties under test, besides some Russians put on as grafts last spring.

CURRANTS.

Notes by A. W. Peart, (*Burlington Station*).

Red and White Currants were a good crop, while black gave about three-quarters of an average.

The season was favorable, there being sufficient rainfall and not too warm.

The prices of red currants were from six to eight cents per quart; black ten to twelve cents. All the currants seem to be hardy, and healthy.

Baldwin: Planted 1903; bush, a moderate grower; fruit, medium size, sub-acid, black; season, medium to late; yield, one-quarter quart per bush.

Belle de St. Giles: Planted 1896; bush, weak grower and unproductive; berry, red, large to very large; season, medium; yield 1½ quarts per bush.

Black Victoria: Planted 1903: very strong grower; fruit, large, sweet; season, medium; yield per bush, ½ quart.

Boskop's Giant: Planted 1903; a strong grower; berry, black, large, acid; season, early; yield, ¼ quart per bush.

Brayley: Planted 1896; moderate grower and not very productive; fruit, dark red, medium size; season, medium; yield, 4 quarts per bush.

Beauty: Planted 1903; strong grower; fruit, black, sweet, medium size; season, late; yield, 1-3 quart per bush.

Champion: Planted 1896; a moderate and fairly productive grower; berry, black, large, sub-acid; season, late; yield, 3 quarts per bush.

Comet: Planted 1903; fairly strong grower; fruit, red, acid, medium to large; yield, ½ quart per bush; season, medium.

Cherry: Planted 1896; strong grower and very productive; berry, dark red, medium to large, acid; season, medium; yield 5 quarts per bush.

Collins' Prolific: Planted 1898; very strong grower as well as productive; berry, black, large to very large, sub-acid; season, medium to late; yield, 4 quarts per bush.

Crandall: Planted 1897; a strong rampant grower, and moderately productive; fruit, bluish-black, large to very large, sub-acid; season, medium to very late; yield, four quarts per bush.

Fay: Planted 1898; moderate grower, fairly productive; berry, large to very large, red, sub-acid; season, medium; yield, 3½ quarts per bush.

Lee: Planted 1896; moderately vigorous and fairly productive; berry, black, large to very large, sub-acid; season, medium; yield, 3 quarts per bush.

Naples: Planted 1896; bush, vigorous and productive; berry, black, large, sub-acid; season, medium; yield, 4 quarts per bush.

New Victoria: Planted 1897; vigorous and productive; fruit, red, small to medium, sub-acid; season, medium; yield, 5 quarts per bush.

North Star: Planted 1896; strong grower and fairly productive; berry, red, medium to large, acid; season, medium to late; yield, 4 quarts per bush.

Perfection: Planted 1903; a moderate grower; fruit, medium to large, acid, red; yield, ½ quart per bush.

Pomona: Planted 1897; a fair grower and moderately productive; fruit, red, medium to large, quality especially good; season, medium; yield, 4 quarts per bush.

Prince Albert: Planted 1897; a strong productive grower; berry, medium, very acid; season, late; yield, 5 quarts per bush.

Raby Castle: Planted 1896; vigorous and productive; fruit, light red, small to medium, acid; season, medium; yield, 5 quarts per bush.

Red Cross; Planted 1896; strong grower; berry, red, medium to large, sub-acid; season, medium; yield, 2 quarts per bush.

Red Dutch: Planted 1897; a moderate grower, productive; berry, red, small, acid; season, early to medium; yield, 3½ quarts per bush.

Red Victoria: Planted 1896; bush, very vigorous and productive; berry, medium to large, acid; season, medium; yield 5 quarts per bush.

Saunders: Planted 1897; strong and productive grower, berry, black, large, sub-acid to sweet; season, medium; yield, 4 quarts per bush.

Standard: Planted 1903; bush, a strong, vigorous grower; berry, black, large, sweet; season, medium; yield, ½ quart per bush.

Success: Planted 1903; moderate grower; fruit, black, large and sweet; season, medium; yield, ¼ quart per bush.

Versailles: Planted 1896; a moderate grower; fruit, red, medium size, acid; season, early to medium; yield, 2½ quarts per bush.

White Grape: Planted 1896; bush, vigorous and productive; fruit, large, white, sub-acid; season, medium to late; yield, 3 quarts per bush.

White Imperial: Planted 1896; moderately vigorous, but not very productive; berry, white, medium to large, sweet and fine in flavor; season, medium; yield, 1½ quarts per bush.

Wilder: Planted 1896; a strong and productive grower; berry, red, medium to large, sub-acid; season, medium; yield, 5 quarts per bush.

Notes by A. E. Sherrington, (*Lake Huron Station*).

Red Currants.

Cherry: Bush, a fair grower, but not as vigorous as some other varieties, hardy and a good bearer; fruit, large; quality, good; yield per bush, 6 lbs., 13 oz.

Fays: Bush, strong and vigorous, hardy; fruit, large; quality, good; yield, 13 lbs., 8 oz.

North Star: Bush, a good grower, but very slender and weak canes, hardy; fruit, small; quality, poor; yield, 2 lbs. 10 oz. per bush. I think this is not the correct North Star.

Pomona: Bush, a fair grower, not as vigorous as it might be, but hardy; fruit, medium to large; quality, of the best; yield per bush, 5 lbs., 10 oz.

Prince Albert: Bush, a strong vigorous grower and hardy; fruit, medium to large; quality, good; yield per bush, 5 lbs., 2 oz.

Red Cross: Bush, vigorous and hardy; fruit, large; quality, good; yield per bush, two years old, 2 lbs.

Raby Castle: Bush, vigorous and very hardy; fruit, small to medium; quality, rather acid; yield per bush, 17 lbs., 10 oz.; a heavy bearer.

Versailles: Bush, strong and vigorous; hardy; fruit, medium to large; quality, good; yield per bush, 5 lbs.

Black Currants.

Champion: Bush, very vigorous and hardy; fruit, large; quality, good; yield per bush, 2 quarts.

Naples: Bush, a strong vigorous grower, and hardy; fruit, large; quality of the best; yield per bush, 3 quarts.

Saunders: Bush, fairly vigorous; hardy; fruit, large; quality, good; yield per bush, 2 quarts.

Victoria: Bush, a fair grower, hardy; fruit, medium to large; yield, none this year.

WHITE CURRANTS.

IMPERIAL: Bush, strong and vigorous, hardy; fruit, medium; quality, good; yield, 4 lbs. per bush.

WHITE GRAPE: Bush, strong, vigorous and hardy; fruit, medium to large, quality, good; yield per bush, 5 lbs.; the best white currant.

NOTES BY CHAS. YOUNG, (*Algoma Station*).

If there is any one point that we excel in up here in the North it is currants. They never fail to produce a heavy crop, red or black. In twenty years I have never known a failure; give them some care, plenty of manure on the surface, keep down the worm on the red and white and nature will do the rest. I have eight varieties under test and all are good and desirable except the white, which, though perhaps the heaviest cropper among them, yet, on account of its color, meets with poor sale.

The old Red Dutch is perhaps best in quality and Fay's Prolific in productiveness. The chief fault of the latter is its sprawling habit, and it scarcely makes enough of new wood.

Saunders black is good; is of rather a strong growing habit, requires thinning out and cutting severely back.

The local price of red currants is 80 cents per 10 quart basket, and of black $1.00 to $1.25.

GOOSEBERRIES.

NOTES BY A. E. SHERRINGTON, (*Lake Huron Station*).

DOWNING: An American variety; bush, strong, vigorous and hardy; fruit, large, color, green, quality, good; yield per bush, 5 quarts.

PEARL: Another of the American varieties; bush resembles Downing in every respect, and no difference can be seen in the fruit; quality, good; yield per bush, four and a half quarts.

RED JACKET: Bush, a strong vigorous grower, hardy; fruit, large; color, red; quality, good; yield per bush, six quarts.

WHITESMITH: An English variety; it is perfectly useless, owing to the mildew which destroys all the fruit.

CROWN BOB: This is also an English variety, but less subject to the mildew than Whitesmith; still the fruit is unsalable on account of it.

NOTES BY CHAS. YOUNG, (*Algoma Station*).

These have done very well this summer, the fruit was good and clean. The bushes were sprayed once or twice for worms. Among those bearing enough to form an opinion were Pearl and Downing, and decidedly the best as well as the most profitable to grow, two qualities that rarely go together. There is not much difference in the bush of these varieties, but in the basket Pearl is rather larger and evener in size, takes the eye better and perhaps yields a little better; both are good, perfectly hardy and make plenty of young wood to renew. They are thin skinned and can therefore be allowed to get ripe if so desired. They are quite large enough for all practical purposes and of the very best quality. I have grown the English berries for some years, but certainly do not recommend them either for profit or for quality. The berries do not mildew to any extent here; the leaf sometimes shows a little of it towards the end of a hot summer, especially if the bush is very open, but I fail to see any reason for growing them to the exclusion of the two former. Red Jacket is good enough, but I would only give it a place after the others. I have received three new varieties of English berries this spring for testing and already notice that some of them lack vigor of bush. I recommend Pearl and Downing; the fruit I sold at 10 cents a box, and I could not supply the demand. My bushes were planted five years ago. I have thirteen under test.

GRAPES.

NOTES BY M. PETTIT, (*Wentworth Station*).

Grapes in the experimental vineyard were a very light crop. The wood did not fully ripen and mature the fruit buds owing to the cold wet season of 1904. On many of them the bearing wood was winter killed.

The following is a report on the varieties I have recommended for profit in the Niagara district, in order of ripening:

CHAMPION: A full crop, ripe September 1st; sold at 30 cents per basket net, in hundred basket lots; one of the most profitable as grown at this station on heavy clay with proper thinning.

DELAWARE: Not a full crop; sample not as good as usual; first picking, Sep. 12th; net price, at that date, 40 cents per basket.

LINDLEY: A full crop; good sample; first picking, Sept. 13th; net price 28 cents per basket.

WORDEN: Average crop; first picking, Sept. 14th; price, 20 cents per basket.

NIAGARA: A heavy crop; fine sample; first picking, Sept. 14th; price, 22 cents per basket.

CONCORD: Medium crop; good sample; first picking, Sept. 25th; price, 14 cents per basket.

AGAWAM: Below an average crop; good sample; net price, 20 cents per basket in car lots.

CATAWBA: Average crop; well ripened; net price, 20 cents per basket in car lots.

I have not included Wilder in the list for profit as previously done; it does not yield quantity enough and it sells for very little, if any, more than Concord.

There are several promising varieties, both new and old; and some of them may in certain localities and soils be as profitable as those mentioned. The following is as short description of some of them:

AMINIA: A very large, black Roger, of excellent quality; vine, vigorous and hardy; not quite productive enough.

BRIGHTON: This well known grape is early; good quality; fine appearance; only medium in productiveness.

CAMPBELL'S EARLY: A large, handsome, black grape of fair quality; hardy; productive; early; very promising.

CAMBRIDGE: Closely resembles the Concord in growth of vine, foliage and fruit; not as productive.

DR. COLLIER: This grape is also of the Concord type, but not as productive.

Early Victor: A very productive black grape; compact clusters; berry smaller than Concord; ripens earlier; quality not as good.

Moore's Diamond: Handsome, white; good quality; earlier, but not as productive as Niagara; valuable on account of its earliness.

Moore's Early: This well known grape should only be planted on deep, rich soil.

Mills: A fine black grape of good quality, very late; an excellent grape for winter use; requires close pruning or thinning.

Requa (Rogers 28): Large, compact clusters; berry, dull red or bronze color; good quality; hardy and productive.

Winchell: Early. white, of excellent quality; fairly productive; vine lacks vigor.

Wyoming Red: Early; productive; a little larger than Delaware; not as good in quality.

Grapes for Wine: There are many varieties which will produce the finest grades of wine which are not profitable to grow; as they are not prolific enough every year. For instance the Diana is the best of all for quality: then comes Lindley, Brighton, Creveling, all extra good, but not productive enough on an average. Catawba is good and prolific, but does not ripen well enough except on certain soils and localities. I would think well of the following for profitable vine grapes named in order: Concord, Worden, Clinton, and Pearl.

Diseases: Vineyards were comparatively free from diseases this season; ours were sprayed with the soda Bordeaux twice and some of them three and four times. A very little brown rot and mildew appeared on unsprayed vines.

All varieties ripened well and foliage kept green and healthy until frost on the morning of October 25th.

Spraying: One row of cherry, plum and peach trees in the experimental plantation was thoroughly sprayed with lime and sulphur; the other rows with soda Bordeaux before the buds started. The cherry trees on which the lime and sulphur was applied were very slightly affected with aphis as compared with the other rows, and peach trees showed very much healthy foliage where the lime and sulphur was applied. Japan plums and a few peach trees sprayed, after the fruit set, with soda Bordeaux lost most of the foliage and fruit. Apple trees were also badly burned. We shall use lime instead of sal soda in future. Where we applied three pounds of sulphur to full grown Lombard trees, soon after the fruit set and again when half grown, it proved far more effectual than four sprayings with Bordeaux mixture, and is much cheaper.

Bradshaw and Reine Claude have again this season been very profitable, as has also Burbank of the Japan varieties.

Fertilizers: We have seen no marked results from the use of stable manure or fertilizers on trees or vines, except in a Baldwin orchard, over twenty years planted. On a row in the centre of the orchard, in the spring of 1902, fifty pounds of Thomas' Fertilizer was applied to one tree and one hundred pounds on the next; two trees were missed, and one bushel of ashes was applied to one tree and two bushels to the next; two trees were again missed, and two hundred and fifty pounds of stable manure applied on the next, and five hundred pounds of manure on the next.

There has been no perceptible difference until this season. When the apples were being picked, there were fully one-third more apples where the manure was applied and the fruit was much larger; the wood growth was also stronger and the foliage better. The other trees made only a fair average with other parts of the orchard.

NOTES BY CHAS. YOUNG, (*Algoma Station*).

This is another fruit that will never be grown successfully in the north. A hardy, early ripening variety, such as Champion, Janesville, or Moore's Early, can be depended on any year to ripen, but the quality compared with Southern grown grapes, is so poor that there is neither money nor pleasure in them. I have 20 varieties under test, besides three received this spring; they are all growing, none are dead, but I do not care to recommend any of them either for pleasure or profit. The vines will grow and fruit attain full size, color up some and stop at that. I have seldom succeeded in raising a bunch of grapes fit for the table, and have very seldom seen any one who could say they did so. They need not be tried further in this station. I have had the best success in growing in the horizontal form, within ten inches or a foot from the ground.

NOTES BY J. G. MITCHELL, (*Georgian Bay Station*).

The few varieties which we have, have been pretty well described in previous reports, therefore there is very little to add. Without exception this year all our varieties were loaded full, the largest and best we ever had. For several years we have been fruiting such varieties as Niagara, Worden, Brighton, Salem, Concord, Delaware, Green Mountain, Moore's Diamond, Champion, Vergennes, etc.

I think the fact is fairly demonstrated that grapes can successfully be grown here. Every one who has a small garden may have some grapes. They are as easily grown as potatoes. So far we have been free from insects or fungus. All we have to do is to prune and tie them on the trellis and they winter in good condition.

PEACHES.

NOTES BY LINUS WOOLVERTON, SECRETARY FOR ONTARIO FRUIT STATIONS.

The season opened July 26th with,—

SNEED, the earliest of all peaches, small in size and very tender in flesh. By many this peach is condemned as of little value, but having no competitor I am inclined to judge it rather favorably. I shipped a few six quart baskets which sold at 35 cents each. The last were harvested about August 10th.

GREENSBORO closely followed Sneed, being in season from August 10th to August 20th. The trees gave a magnificent yield of about 100 quarts per tree, or about eight baskets each. It is a soft peach, too soft to ship far, but it colors prettily, and does not show bruises as badly as the Rivers. It also ripens through and through, which many of the early peaches do not.

ALEXANDER came in about as early as Greensboro, but in many cases where unthinned was worthless for market. Where well grown and well ripened it was salable at a low price.

RIVERS followed the Alexander, but in most cases was so overloaded that it was small, lacking in color and flavor, and almost unsalable. Where thinned and grown on vigorous trees the fruit was large and fine.

Triumph came in about the 20th of August; but when the trees were unpruned and the fruit not thinned, the latter was scarcely worth gathering. Many of the trees suffered from twig blight and altogether such fruit was unsatisfactory. Where carefully pruned and thinned, however, the fruit was very fine. It is the first yellow fleshed variety, and its color was in its favor among buyers.

Hynes Surprise was in season from August 20th to August 30. Though not large, it is a variety of real value in the home garden for it is the best early dessert peach. The yield was good but the trees were not overloaded. Like all early peaches it sold at a low price.

Yellow St. John seems to gain in popularity every year; certainly during 1905 it has been remarkably fine. It was large in size, sometimes, where grown on young trees, quite rivalling early Crawford in appearance. This season also it was very highly colored, and packed beautifully in two layers in the seven quart basket. We began harvesting it on the 3rd of September, and were able to secure a few dozen on the 12th of the same month to show at the Fruit Fair in Hamilton.

Early Crawford was a great disappointment where not thinned, for the fruit was very small, and had to be sold as second class. The season extended to the 20th of September, about a week later than usual.

Fitzgerald, Golden Drop, Garfield, Millionaire, Jacques Rareripe and **New Prolific** are all of the early Crawford type, and of about the same season.

Reeves was exceptionally large in size, highly colored and very beautiful. It is also yellow in flesh, and a fine market peach, but not very productive. It is a trifle later than Early Crawford.

Wonderful is another new yellow flesh peach large in size, fairly productive, and a few days later than Early Crawford. I was very favorably impressed with it.

Elberta surpassed all records this year. The tree did not show the least indication of Curl Leaf, was most vigorous in growth, and the most productive variety in the orchard. One remarkable thing about the Elberta was that, notwithstanding the immense crop, which broke down many trees, the fruit grew to a large size and took on a superb color. The fruit began ripening about the 20th and was harvested by about the 28th. The worst fault of this peach is its tendency to drop its fruit almost before full maturity.

Champion is the finest white flesh peach, of the season of the Early Crawford, viz., in 1905 between the 10th and 20th of September. The trees loaded tremendously and the fruit was a great favorite for dessert.

Thurber is one of the new peaches which this season has attracted considerable notice. It is a magnificent white flesh peach, of the largest size, firm enough to carry well, but withal of the most delicious melting flesh and of the highest flavor. Its season was from the 20th to the 30th of September.

Crosby and Kalamazoo began ripening about the 25th; both were overloaded, and too small to deserve much notice this season.

Wheatland impressed me this season as the best yellow flesh peach in the orchard. It is large, beautiful in appearance, of the highest flavor, making it suitable for either dessert or cooking, a week later than Early Crawford, and the tree is fairly productive. No one who knew the varieties would ever buy Elbertas when he could get Wheatlands.

Longhurst was as usual not very attractive in appearance, but its good quality for canning still hold for it a leading place with many growers. When allowed to overload the fruit was too small to be marketable.

Matthew's Beauty ripened between September 27th and October 5th. It was an attractive looking yellow peach, smooth of skin, and with a fine blush. In form it resembled Elberta so much that it might be called Elberta Late; but in quality it quite surpassed that variety.

Willett was harvested the first week in October. It is a large, roundish, yellow-flesh peach, with a red cheek. It is a free stone, of good quality, and a splendid shipper. Then came several varieties to end up the season as for example Lemon Cling, for which we have no longer any place; Carlisle, which was this season rather small and almost entirely lacking in color and consequently unattractive, although the flesh was a beautiful pure white and excellent in quality. The latter was harvested on the 9th of October.

Smock held its place as about the best late peach, giving a splendid yield, but two others of about the same season, viz., between the 10th and 15th of October, closely disputed places with it, viz., Greary's Holdon, and Beer's Smock, both of which are free stone yellow-flesh peaches of about the size and shape of Smock and well worth further trial.

Salway is one of the latest good peaches of the season, but does not always ripen in Ontario.

Orr's Seedling was shown me on the 19th of October by the originator, Mr. W. M. Orr of Fruitland. It impressed me as being a peach of great promise. It is large, 2¾ inches in diameter, almost round, yellow fleshed, of excellent quality, a free stone, and superior to any peach of the same season, I have ever seen. It is certainly worthy of careful testing to see if it will ripen in other seasons as well as it has done this season. The peach is a chance seedling on clay ground.

Soper, Bray, and Steadley are all white flesh peaches of good quality, freestones, which ripened about the 20th of October, (1905), and kept inside in good condition until about November 1st. The largest and the best in quality is the Steadley which measured 2½ inches in diameter. If a peach is wanted so late this seems to be desirable.

Kalamazoo was almost as late, and a yellow flesh; but this year the trees were overloaded and the fruit very small.

Notes by A .W. Peart, (*Burlington Station*).

The following varieties gave fruit, some of them very abundantly:—Alexander, Crawford, Champion, Crosby, Greensboro, Longhurst, Sneed, Steven's Rareripe, Yenshi.

Notes by W. W. Hilborn, (*Southwestern Station*).

I have little to report this season as all the peach trees of the experimental plot were destroyed by frost. All the peach orchards on high dry soil in this locality were killed during the winter of 1904. Long continued cold weather froze the ground to a depth of four and five feet. There was no snow during this cold period to prevent the frost from penetrating below the roots. When this occurs it proves fatal to the life of a peach tree.

As per instructions of the Board of Control I planted about five acres to commercial varieties last spring. These have made a good growth and will be protected during the coming winter by a cover crop of Rye and banking up soil around the trunks of the trees.

Varieties planted were mostly of the following, Yellow St. John, Fitzgerald, Garfield, Engle, Mammoth, Edmunds, Reeve's Favorite, New Prolific, Elberta, Gold Drop, Banner, and Wigle.

It is my intention to give special attention to various methods of winter protection of this orchard, with the hope that some practical method can be adopted that will protect the trees and not be beyond the reach of the average grower in cost of application.

NOTES BY A. E. SHERRINGTON, (*Lake Huron Station*).

The peach trees that were planted previously to the winter of 1903 where all frozen out. Four varieties have been planted again, and the trees are doing well but have not fruited yet.

NOTES BY W. H. DEMPSEY, (*Bay of Quinte Station*).

BOKHARA: The part of the tree which survived the winter of 1903, bore a fine crop of medium quality.

FITZGERALD, which sustained very little injury beyond the fruit buds, from the severe winter of 1903, bore a medium crop of fine large peaches of good quality.

NOTES BY J. G. MITCHELL, (*Georgian Bay Station*).

Last year we had no peaches, but this year gave us a very nice crop on all the trees which survived the freezing of 1903. Fitzgerald is our favorite. It is much hardier with us than Crawford; bore a fine crop this year, only missed once in four years. Tyhurst also does well having failed only once in six years. Bowslaugh's late had a fine load; failed once in five years. Crosby a good crop to scattering fruit every year and Triumph the same. Champion, Hales Early, Yellow St. John, and Elberta were all killed except one tree, with the cold of 1903.

Let it not be supposed because peaches do fairly well on the Station grounds they will do that all through the Georgian Bay district. The peach belt is only a narrow strip from one to three miles wide along the lake front from Collingwood to Owen Sound.

PEARS.

NOTES BY A. W. PEART, (*Burlington Station*).

In regard to blight of pear trees, I submit the following divisions. The trees have reached bearing age, most of them are nine years old, and are grown on a sandy-gravelly loam in a good state of cultivation. Cultural conditions are the same for all:—

No Blight: Bosc, Boussock, Clairgeau, Giffard, Kieffer, Louise Bonne. Lawrence, Seckel, Sudduth, Tyson, Vermont Beauty, Wilder.

Some Blight: Anjou, Bartlett, Buffum, Duchess (dwarf), Josephine, Marguerite, Winter Nelis.

Badly Blighted: Clapp's Favorite, Easter Beurre, Howell, Lawson, Osband's Summer, *President Drouard, Sheldon.

My experience would lead to the conclusion that pear trees grown on clay or clay loam are less subject to blight than those on lighter soils, and that too much cultivation and manuring, especially on the lighter soils, tend to induce blight through an undue growth of wood.

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* Trees all killed.

NOTES BY G. C. CASTON, (*Simcoe Station*).

BARTLETT does very well top worked on Flemish Beauty stock; and I have a block of Clapp's Favorite, not experimental stock, but in my orchard, that is doing very well. Idaho and Anjou in the experimental plot are doing fairly well; and I have several varieties top worked on Russian and Flemish Beauty stock that are not far enough advanced yet to give a definite report; I may have something interesting to report in future about them.

NOTES BY HAROLD JONES, (*St. Lawrence Station*).

Referring to the report of 1904, all the varieties sent me for test are dead or severely injured, except Flemish Beauty, Clapp's Favorite and Ritson; of these three Flemish Beauty is the hardiest and the only one likely to succeed.

Possibly it would be worth while to test a few varieties as dwarfs which I believe will be the only way in which a pear of good quality can be grown in this section.

I may say that I have a pear growing on the farm that has borne annual crops for four generations. It is a first class preserving pear and sells on the local market, where known, in preference to any of the named varieties for canning or preserving. It has been renewed from time to time by transplanting sprouts or suckers.

It is possible that this pear might succeed in other northern sections, where named varieties fail, and it could be distributed by growing the sprouts in nursery row for a year or two until they become established on their own roots.

NOTES BY W. H. DEMPSEY, (*Bay of Quinte Station*).

The pear crop was very light; only a few varieties bore enough to do any thing with. There was very little blight and a marked decrease of Pear Psylla during the past season.

KIEFFER as usual was loaded and the fruit was much larger and finer this year than usual.

GOODALE has only made a moderate growth; it does not seem to be strong: has fruited very sparingly; sells well in our local markets.

LINCOLN made a very good growth, and has fruited well; the fruit is of poor quality; I would not plant it.

DR. JULES GUYOT is doing remarkably well here; it started to fruit the second year after planting and has fruited every year since. The fruit is similar in form and color to Bartlett; it ripens a week earlier: the quality is good.

SUMMER DOYENNE was planted in 1895. It is a medium grower: productive: the fruit medium in size and ripened in July and August: it does not take well in our market.

WINTER NELIS was planted 1895: made moderate drooping growths: has only bore a few small pears yet: is of no value for this section.

FRED CLAPP was planted 1895: a moderate grower: foliage, dark, handsome: fruited this year for the first: fruit large, fine and of good quality: looks promising.

LOUISE BONNE was planted 1895: made medium growth: fruited this year for the first time: a very good pear.

POUND was planted 1895; a medium grower: this is the first year it fruited: producing a good crop of large, green pears.

Seneca was planted in 1897; the tree is a thrifty, upright grower; fruited two years; fruit large, yellow, with red next the sun; medium quality; season September.

Superfine was planted 1897, and made a moderate growth; tree spreading, blighted once, produced only two good crops; fruit ripened in October; good quality; I would not recommend planting it.

NOTES BY A. E. SHERRINGTON, (*Lake Huron Station*).

Thirty-five varieties of pears are now under test at this station, but as only a few have fruited as yet, producing only one or two fruits per tree, I cannot make any report as to quality, or yield. All trees are doing well. I am top working some Kieffer stocks over to other better sorts and I am looking for a great improvement in some varieties by this method.

NOTES BY J. G. MITCHELL, (*Georgian Bay Station*).

This season Anjou produced the largest and finest crop we ever had, exceptionally clean and smooth. Some of the trees were bent to the ground. They seem to be doing better as they grow older. Duchess gave rather a lighter crop than usual, but the fruit was very large, clean and smooth, and the best in quality we ever had. Bartlett is still the most profitable early pear here. They generally yield a good crop, ripening just after the Niagara district pears are done; and this, together with their fine quality, makes them always command a ready sale.

Such varieties as Howell, Louise, Beurre Clairgeau, Clapp's Favorite, Goodale, are all doing very well. In fact, we have not any failures to report in pears. Bartlett Seckel fruited both last year and this, a very few fine pears. I am very much impressed with them. They are very strong, healthy growers, and most promising in every way. None of the recent French importations have yet borne fruit, and some are, so far, not very promising; they are very slow growers, while others are doing very nicely. They are living, however, and a few blossoms showed on some of them last spring, and we hope to get some samples next year.

NOTES BY CHAS. YOUNG, (*Algoma Station*).

The winter of 1903-4 was so destructive on this fruit that I may say I have to begin at the beginning again. Seventy-five per cent. of the trees, such as they are, are left; some growing from a stump, others with half the top gone, but all more or less injured. Among the nine varieties tested Kieffer is gone, root and branch; this was the earliest to come into bearing, but the quality was so poor I do not want any more of it. Anjou, not supposed to be a hardy variety, has come through better than even Flemish Beauty. None, except Kieffer, were killed to the ground. Bessemianka suffered least, and bore fruit this year, small and poor in quality. The winter of 1903-4 was the hardest ever known in Algoma, and, although I cannot say that pears before that were successfully grown in the district, still, to some extent, they could be. Unless we can get something as hardy as Bessemianka, and of a better quality, the general public will have to depend for a supply upon growers further south.

At the present I would not recommend any for planting, although some of the Russians might be experimented with. I have several on old stocks for test, and hope to report more favorably later on when they come into bearing. All were planted in the spring of 1900.

I would most distinctly affirm that all trees, apples and pears, planted in the north, should be headed low. Pears, especially, as near a bush form as possible. If the lower limbs are on the ground, all the better.

PLUMS.

REPORT ON VIGOR AND HABIT, BY L. WOOLVERTON, SECRETARY FOR FRUIT STATIONS.

Scale in points from 1 (lowest) to 10 (highest).

Varieties.	Habit.	Vigor.
Abundance	Upright, spreading	8
Arch Duke	Upright	8
Arctic	Round	6
Baker German Prune	Upright	7
Belle de Septembre	Upright	5
Burbank	Spreading, sprawling	5
Chabot	Upright, spreading	10
Czar	Upright	5
Dunlop	Upright, spreading	5
Fellemberg	Round	5
German Prune	Round	5
Golden Cherry	Round, willowy	10
Goliath	Spreading	6
Gueii	Upright	8
Hale	Round, spreading	10
Hand	Round	8
Huling	Round	6
Ickworth	Round	7
Imperial Gage	Round	8
Jefferson	Upright, spreading	10
Kingston	Upright, spreading	8
Lady Jane	Spreading	8
Lafayette	Round	6
Lincoln	Round	5
Luscombe	Spreading	7
McLaughlin	Round	5
Orleans	Round	8
Oullin	Upright	8
Peter's Yellow Gage	Spreading	8
Prince d'Agen	Round	5
Prince Engelbert	Upright	7
Purple Egg	Upright	10
Quackenboss	Upright	10
Red June	Upright, spreading	9
Reine Claude	Round	5
Saunders	Round	5
Shropshire	Very upright	8
Sophia	Round, willowy	10
Spaulding	Upright, spreading	8
Tatge	Upright, spreading	5
Transparent	Round	5
Victoria	Round, spreading	7
Washington	Upright, spreading	8
Wild Goose	Spreading	10
Willard	Spreading	9
Yellow Gage	Round	8
Younker's Golden	Round, spreading, willowy	10
York State Prune	Round	8

NOTES BY J. G. MITCHELL, (*Georgian Bay Station*).

EUROPEAN PLUMS. A great number of varieties of these plums have been tested here. After an extensive trial, and under quite equal conditions for all, the old well-known and well-tried varieties still carry the palm. Unlike the Japans, many of these plums are from fairly good to excellent quality. But I would, after long experience with large plum orchards, advise the planting of few varieties. Plum growers would find very much less trouble and, also, more profit with just a few varieties, sufficient to cover the season, and they the very best.

Climate and other conditions are so different in places a short distance apart that I don't like to advise except in a general way. The following list should give excellent satisfaction, and are what I would plant for myself. to cover the season: (1), Red June; (2), Washington, where it will do as well as it does here; (3), Bradshaw; (4), A few Lombards, Quackenboss (or Glass Seedling); (5), Prince D'Agen, which is a good bearer, and almost as good a plum as German Prune, usually a very poor bearer. I would include also Arch Duke, Yellow Egg, Pond Seedling, Coe's Golden Drop, and Reine Claude. To this might be added Monarch, as the plums are splendid shippers, but the trees are very short-lived with us.

CULTIVATION, PRUNING AND CARE. Let me say right here, there is no fruit which responds to good cultivation, fertility and care better than the plum, and there is none, I think, which more quickly show neglect. Therefore, it is expedient they should never be neglected. Cultivation in the early season is to conserve moisture. They need lots of water fertilizer to promote growth and fruit. We might just as well try to raise a prize calf on starvation rations as to grow plums without fertility.

A word about pruning. It has been generally supposed that plums require very little pruning. Experience has taught me such is not the case. They require very careful pruning, all dead or decaying wood should be cut out and burned every year. All long, slender shoots should be cut back to a foot or so long, and, finally, the whole top thinned to admit free circulation of air and sunshine to all parts of the tree.

SPRAYING. I find it a paying operation to spray once just before the buds begin to burst; again, when young plums are just formed, and again in about eight or ten days, as to weather.

If all the above conditions are faithfully carried out it is almost certain that there will be a crop of very good plums. It should be needless to say the spray should be the standard Bordeaux mixture, with Paris green added.

JAPAN PLUMS. Although strong growers, quite hardy, good bearers, and many of them of the most attractive appearance, yet their quality is so much against them that they are fast becoming unpopular. In my opinion, and, also, in the opinion of many more fruit growers, nothing else has so much tended to make plum-growing unprofitable as the introduction of the Japan plums. Very few people who ever bought a basket of Japan plums will ever want a second one, and I, myself, would not use the best basket of Japan plums I ever saw if I could at all get one of any of the well-known European varieties.

The canning factories, at least all those I have interviewed, do not want them. They say that the Japan plums make a very poor class of goods. Even here, where several lake traders call, and large quantities of plums are shipped north, they are hard to sell; in fact, they cannot be, only at a low price, which reflects very much against the plums of better quality.

Therefore, I could not recommend the planting of Japan plums at all, unless it would be the Red June, and then in quite limited numbers. They are more like the European, and the first to ripen. In addition to that, Chabot, Burbank, and Satsuma are the best, as far as tested here.

NATIVE PLUMS. After a thorough test of several years, and under exceptionally favorable conditions, all the native or American plums I have for profit, as compared with the European varieties, have proved themselves to be most signal failures. Out of all the large list which we had in test there is not one single variety I could recommend, but must condemn them all as not worthy of a place in any orchard in the best fruit sections of Ontario.

NOTES BY HAROLD JONES, (*St. Lawrence Station*).

The plum trees that survived the freeze of 1903-4 came through the past winter in fairly healthy condition. All the new wood made during the summer of 1904 came through uninjured, and the fruit buds wintered well. The following varieties fruited:

BURBANK: Two trees planted 1899; a few fruits ripened in 1900; buds injured in 1901, 1902 and 1903; one tree injured, and one killed in 1904: in 1905 the living tree bore a crop of fruit, about 18 qts.; some injury from plum rot at picking time.

GUEII: Planted 1896; trees hardy and vigorous; fruit buds partly injured most winters, but this year the trees bore a full crop, part of which was injured by plum rot at picking time.

GOLD: Planted 1898; one tree survived the freeze of 1903, and produced a crop of one plum this year; tree is not in a healthy condition.

GLASS SEEDLING is proving a hardy, healthy tree, but does not bear any fruit; a few blossoms this spring, but no fruit on trees planted in 1897.

LOMBARD gave a fair to full crop of fruit, and was much freer from plum rot than Gueii or Burbank.

MARU, OGON and RED JUNE continue healthy, but do not set fruit, although they had a good bloom this spring.

COL. WILDER, WHITAKER and HAMMER had light crops.

WOLF, WYANT and DESOTO suffer severely from attacks of aphis from year to year, which ruins the crop, if not controlled early in the season. In any event, these plums are of no commercial value, and are not worth growing, except for home use where Europeans or Japans do not succeed.

NOTES BY A. E. SHERRINGTON, (*Lake Huron Station*).

ABUNDANCE: Tree, vigorous and hardy; fruit, large; color, reddish purple; quality, good; yield per tree, five and a half baskets; ripe, August 19th.

BURBANK: Tree, spreading, vigorous, healthy and hardy; fruit, large, if thinned, or not allowed to overbear; color, red; quality, good for canning; yield per tree, 12 baskets; one of the best of the Japanese varieties.

BRADSHAW: Tree, upright to spreading, vigorous and hardy; fruit, large; color, purple; quality of the best; yield, 5 baskets per tree; a very profitable plum.

COE'S GOLDEN DROP: Tree, strong, vigorous and hardy; fruit, large; color, yellow or light green; quality, medium; a late variety; yield per tree, 5 baskets.

FIELD: Tree a vigorous upright grower, hardy, does not come into bearing as early as some other sorts; fruit, medium to large; color, purple; quality, very good; yield, four and a half baskets.

Gueii: Tree, vigorous and hardy; fruit, large; color, purple; quality, good; yield per tree, 12 baskets; one of the best of the European varieties.

Gold: Tree a slow grower, but hardy; fruit, medium; color, yellow; quality, poor; yield per tree, two quarts; worthless.

Hughes' Seedling: Tree an upright grower, vigorous and hardy; fruit, medium to large, resembles yellow egg, but quality not so good; yield per tree, three and a half baskets.

Improved Lombard: Tree resembles the old Lombard; fruit, about the same as the old variety; yield per tree, four baskets.

Imperial Gage: Tree vigorous and fairly hardy; fruit, medium sized color, yellow; quality, rich and good; yield per tree, 8 baskets.

Lombard: Tree vigorous and fairly hardy; fruit, medium to large; color, purple; quality, good; yield per tree, four baskets.

Monarch: Tree vigorous and fairly hardy; fruit, large; color, purple, with heavy bloom; quality, good, first-class for shipping; yield per tree, five and a half baskets.

Ogon: Tree vigorous, hardy, and early bearer; fruit, large; color, yellow; quality, good; yield per tree, one basket, two years old.

Prince Englebert: Tree an upright grower, fairly hardy; fruit, medium to large; color, purple; yield per tree, five and a half baskets.

Pond's Seedling: Tree an upright grower, vigorous and hardy; fruit, very large; color, red; quality, rather coarse; yield per tree, four and a half baskets.

Quackenboss: Tree spreading, vigorous and hardy; fruit, very large; color, purple; quality, very good, must be left on the tree until fully ripe; yield per tree, seven baskets.

Red June: Tree is a strong and vigorous grower, hardy and productive; fruit, large; quality, good, valuable owing to its earliness; yield per tree, three baskets.

Shippers' Pride: Tree upright, strong and vigorous grower; fruit, large; color, purple; quality, good, very firm, making it a good shipper; yield per tree, six baskets.

Spaulding: Tree vigorous, spreading and hardy; fruit, medium; color, yellow or green; quality, good; yield per tree, ten and a half baskets.

Victoria: Tree moderately vigorous, hardy, and a persistent bearer; fruit, large; color, mottled; quality, good, this is the favorite in England and Scotland; yield per tree, seven and a half baskets.

Yellow Egg: Tree vigorous, spreading and hardy; fruit, large; color, yellow; quality, good, but a little coarse; yield per tree, three baskets.

Notes by A. W. Peart, (*Burlington Station*).

Newer Varieties. American: Planted 1901; tree upright, spreading, hardy, moderately vigorous; fruit, medium to large, oblong, light yellow, mantled with crimson, and very handsome; season, early September; quality only fair; yield per tree, two quarts.

Blood No. 4: Planted 1898; tree and fruit resemble very closely the Satsuma, the flesh being red to the stone; yield, two eleven-quart baskets per tree.

Normand: Planted 1898; tree a spreading, hardy, moderate grower; fruit, large, round, yellow, firm and meaty; with a distinct nutty flavor like that of a well-matured Ogon; quality, excellent; season, last of August; yield, one eleven-quart basket per tree.

There was a medium crop of plums this year, although the rot was very bad in some varieties, and curculio bad, causing considerable loss in the early part of the season.

AMERICA: Planted in 1900; tree made slow growth, bore six small, red plums this season.

BURBANK: As usual, bore a heavy crop of fine plums that sold well in our local market at $2.00 per bushel. Trees planted in 1896 produced 2½ bushels.

ABUNDANCE: Planted in 1896; tree is not very hardy, freezing back more or less each year; has produced but very little fruit yet.

ORANGE PRUNE: Planted 1895; tree made good growth; has yielded but little fruit, and of very poor quality.

CHABOT: Planted in 1897; made rapid growth; productive, maturing in August.

NOTES BY G. C. CASTON, (*Simcoe Station*).

Of over 20 varieties of plums of the European class tested here one stands out prominent as thoroughly hardy. That one is the Staunton. It is now quite a large tree, and came through the severe winter of two years ago unharmed, and bore a nice crop this year. Of the Japans the Burbank is about the only one surviving. These fruited well this year. I have some of the Americana class, but they are not worth growing.

NOTES BY CHAS. YOUNG, (*Algoma Station*).

All plums, except the Americana class, suffered more or less on account of the winter of 1903-4. The percentage of loss does not fix the degree of hardiness by any means, for I notice that trees which carried a heavy crop in 1903 suffered most in the following winter. I am losing my preference for the Japans as a whole somewhat. They are not strictly an honest fruit, that is, to put it in plain English, they look better than they taste. Of course they are not all poor in quality; Burbank is a good plum, and one of the most desirable in this class; it requires severe cutting back to form a closer top. Taking quality into consideration, this is for this section perhaps the most desirable in this class. Red June may be better, but is more tender, and absolute hardiness should be the first consideration here. Ogon came through that severe winter better than any of this class; it is a handsome fruit, but not first rate in quality; it bore a small crop this year. Gold fruited for the first time; it is fairly hardy, and better in quality than some of the others. Wickson is too tender, I have replanted it twice, and lost all. Willard is only worth growing as an ornamental; it is completely covered with blossom in the spring, but not one in a thousand sets fruit; the quality is very poor; the tree is moderately hardy. America kills back on the south side of the top every winter. Smith's October had a few fruits for the first time this year.

The Europeans, as a class, are not quite so hardy as the Japans, but the quality is better. Reine Claude I have lost completely. It was planted on low, wet ground, and this may have been the reason. Glass Seedling and Lombard have suffered least, and bore some fruit this year. They have recovered better than any of the others. This last is inclined to overbear some years. No curculio has made its appearance here yet, nor has black knot affected any of the European plums.

I was badly disappointed with the Americana plums before they began to bear fruit; it was very annoying to see a fine, big top half broken off;

but they soon recovered, and are absolutely hardy, and in just such a season as 1905, when we have few plums, we can estimate their value. I have Hawkeye, Wolf, Stoddard, and De Soto. All are desirable in this section. They are poor plums to eat out of hand, tough, thick skins, but excellent for preserving. I would like to have them ripen two weeks earlier. This is a most desirable class of fruit for the North, especially for those who do not make a specialty of fruit growing. This class should be further tested, and, if possible, some variety a little earlier, and with less of the appearance of the wild plums, could be had, and of as good a preserving quality as De Soto; then as near perfection as we can reasonably look for in this fruit would be attained.

I have 22 varieties under test, mostly Europeans.

RASPBERRIES.

Notes by A. E. Sherrington, (*Lake Huron Station*).

Brandywine: A poor grower, canes small and weak, lacks vigor; fruit, small, half quality, rather poor and soft; color, bright red; ripe July 11, last picking July 22; yield, 12 pounds per 20 feet of row.

Cuthbert: A very strong and vigorous grower, canes strong, healthy and hardy enough to make it a very profitable variety; size of fruit, 11/16 of an inch; color, dark red; firm, and quality of the best; ripe July 19, last picking August 14; yield per 20 feet of row, 21 pounds 11 ounces.

Caroline: Plant, strong, vigorous and hardy; fruit, small, quality very poor; color, white; ripe July 17; yield per 20 feet of row, 9 pounds 14 ounces. Poor.

Golden Queen: Canes strong, vigorous and hardy; size of fruit, 5/8 of an inch; color, white; quality, good; ripe July 15, last picking August 14; yield per 20 feet of row, 14 pounds 2 ounces.

Herbert: Plant, strong, vigorous and very hardy; size of fruit, ¾ inch; color, bright red; quality, good; ripe July 17, last picking August 11; yield per 20 feet of row, 35 pounds 5 ounces.

Harris: Canes very small, only about 18 inches high; size of fruit, ¾ inch; color, red; quality, good; ripe July 13, last picking August 11; yield 18 pounds.

Marlboro: Canes strong, of dwarfish habit, healthy and hardy; size of fruit, ¾ inch, firm and fair quality; color, bright red; ripe July 13, last picking August 11; yield per 20 feet of row, 20 pounds 10 ounces.

Miller: Canes fairly vigorous, healthy and hardy; size of fruit, 5/8 inch; color, red; quality, fair; ripe July 11, last picking August 7; yield per 20 feet of row, 16 pounds 7 ounces.

Phoenix: Plant fairly vigorous and hardy; size of fruit, 5/8 inch; color, dark red; quality, good, firm; ripe July 15, last picking August 14; yield per 20 feet of row, 24 pounds.

Reliance: Plants fairly vigorous and hardy; size of fruit, small, ½ inch; quality, good, but soft; ripe July 11, last picking August 3; yield per 20 feet of row, 15 pounds 6 ounces.

Thompson: Plants small and weak, a poor grower; size of fruit, ½ inch; soft, and quality only fair; ripe July 11, last picking August 7; yield 7 pounds.

Turner: Plants fairly vigorous and very hardy; size of fruit, small, ½ inch; color, dark red, soft, but quality good; ripe July 11, last picking August 7; yield per 20 feet of row, 15 pounds 11 ounces.

NOTES BY G. C. CASTON, (*Simcoe Station*).

Cuthbert is still the leading market berry, and will continue so until something better turns up. Although it kills back a little in the tips, yet there is nothing among a good many varieties tested to supersede it. This was decidedly a raspberry year, and the crop was one of the best ever harvested. I have found it the best plan in pruning, especially old plantations, to allow the canes to grow during summer and not stop or pinch them; and in the spring to cut back to the sound wood, thus cutting out the frozen tips as far back or a little farther than they are injured by the winter. I have found this plan to give better results than the former plan of pinching back in summer. I have quit growing Black Caps and the purple crosses. They were not in demand, and do not pay.

STRAWBERRIES.

NOTES BY E. B. STEVENSON, (*Strawberry Station*).

The strawberry season in this section was nearly two weeks later than usual. Snow covered the ground until the middle of March, which was fine the whole month. Snow had all disappeared by the last week, then followed some very warm weather. The temperature one day was 76° in the shade, and other days were quite warm the last week in March. April came in bright and fair, changed the second week to cold and high winds; on the 14th very cold and snow; on 15th rain and flurries of snow; 16th cold and snowy; 17th to 21st cold and snow, with very hard frost at night; rain the night of 20th turned to snow; snow covered the ground all the 21st.

May was very cold, frosty nights. The consequence was that strawberries were late in blooming; all the first blossoms were frozen. June came in wet and cold at night, with frosts from 3rd to 8th, and wet all the time. The sun was hardly seen during that period, this sort of treatment by the sun was very hard on the strawberry blossoms. The crop was short, all the first ones having succumbed to the late frosts; still we had a fair crop of the medium and late varieties. This has been a season in which the medium and late varieties have been more profitable than the early and extra early sorts.

The first picking of Van Deman was on June 20th. We also picked the first of Johnson's Early and Lord Sheffield on that date. Howard's 103 and Early Hathaway we picked June 22nd, and Annie Hubach was first picked June 24th.

The old standards such as Tennessee, Prolific, and Haverland, Glen Mary, Splendid, Clyde, Williams, Sample, Senator Dunlap, Brandywine, all did well. Tennessee Prolific and Sample and Haverland were about the best of the old varieties. Parson's Beauty did very well this season. These old varieties have been so often described, and are so well known, that it will not be necessary for me to burden my report with such description, but will use my allotted space in placing before you the newer and less known kinds that fruited with me the past season. I will give them in alphabetical order; but, before doing so, I would just like to single out one or two of the new kinds for special mention, such as the "Cardinal," "Wonder," and "Howard's No. 103."

The Cardinal, I believe, will take a first place as a market berry when it is well enough known. The first plants of it were sent me two years ago by the originator, Geo. J. Streator, of Ohio. He made great claims for it. I would first say that it has proved to be all that he said it was, and I hear of it doing as well in other places, viz., A. W. Clarke, of Rhode Island, says with him, "It is all that the originator claimed for it; it is a wonderful berry."

I will now endeavour to give a description of the new and largely unknown varieties which I have fruited this season.

Annie Hubach (Perfect): Originated and sent out by Hubach and Hathaway, of Arkansas. Plant healthy, stools out, each plant has a half dozen fruit stalks, loaded with fruit; berry long, conical; seeds somewhat imbedded; good scarlet color; firm and tartish; very productive and early; medium in size.

Arkansas Black (Perfect): From the same firm as above; plant large, healthy, dark, stools out, only medium in productiveness; berry very roundish, dark scarlet, medium to small in size, of poor quality, not desirable.

Alice Hathaway (Perfect): From the same firm. Plant healthy, a good runner, and productive; the berry medium to small, roundish conical, scarlet, and good quality, worth trying.

Auto (Perfect): Sent out from Maryland. Plant is strong and healthy, a fair grower; the berry is large, somewhat irregular, resembles Glen Mary.

August Luther (Perfect): is a good early, and does well in many places; a failure in others.

Aroma (Perfect): A strong, healthy plant, one of the best late varieties, a good pollenizer for late pistillates; it ripens a little earlier than Gandy, but continues later; the berry is large and fine; a good late.

Armstrong (Perfect): This is almost identical with New York Corsican, Uncle Jim, and Maximus, and others. I can see no difference between them. The plant is large and healthy, a good grower; the berry is large, the flavor is good; somewhat irregular; medium only in productiveness.

Ben Davis (Perfect): The plant is healthy, a good runner, and very productive; the berry is roundish conical, somewhat irregular, scarlet with yellow seeds, medium to large in size, medium firm, of fair quality; worthy of a trial.

Beaver (Perfect): This was sent me by Mr. Crawford, of Ohio. It has been a disappointment. The plant is small, hugs the ground, shows considerable rust; it makes runners freely, is fairly productive of small, roundish berries; is quite firm, white inside, of good quality. I will give it further trial.

Buster (Imperfect): Sent out some years ago by C. C. Stone. The plant is a strong, healthy grower, making runners freely; the berry is large, roundish, bright red, medium in firmness, quality fair, but acid; medium to quite late; it is well worthy of a trial by growers.

Bubach (Imperfect): Brandywine, (Perfect): Bismarck, (Perfect): Beder Wood, (Perfect): All did well; are so well known and grown that it is not necessary to describe them more than to say they maintain their position held for so long; it is hard to beat them.

Clyde (Perfect): One of the best known and most grown; with me it it is weakening in plant vigor; it did well the past season; fruit large and good quantity.

COMMONWEALTH (Perfect): Originated with Wm. H. Monroe of Massachusetts. Plant is large, healthy, a good grower, shows no rust; medium in productiveness; berry is large, conical like Woolverton, resembles it very much in shape and appearance also in taste; I should call it a second Woolverton. It is claimed for it that it will be the "great coming berry." Well perhaps, but it must do better than it did for me the past season.

CARDINAL (Imperfect): Originated by Geo. J. Streator, of Ohio. The plant is very large and healthy, no rust has yet appeared on it, the foliage is bright green, it makes lots of runners that root freely; in fact it has made the widest row of any in my trial plot this season, the fruit stalks are strong and tall, and hold the fruit well up from the ground; the berry is large, not as large perhaps as Clyde or Bubach but large; the plant is very productive: berry of good color, attractive and of good flavor, a little acid, firm enough to ship a good distance; the reports from other places, where it has been grown the past season, are all favorable, some of the reports are very favorable. At the Rhode Island Exhibition for 1905 it obtained 1st prize for "best new variety" and a "certificate of merit." I believe it will prove to be a good market berry.

CORSICAN (Perfect): See "Armstrong."

CLIMAX (Perfect): Originated by C. Graham of Maryland from seed of Bubach. The plant is strong and healthy; berry is roundish, large scarlet, early, and quite productive; it is worth of a trial.

CHALLENGE (Perfect): The plant has proved so weak with me that it has been a complete failure here.

EARLY HATHAWAY (Perfect): Originated by Hubach and Hathaway of Arkansas. Plant a good runner, healthy; berry conical, firm, red all through, acid of good quality, medium to large; very productive; a good early, well worthy of a trial.

EARLY MARKET (Perfect): From Hubach and Hathaway. Plant healthy, good grower, makes plenty of runners, quite productive; berry scarlet, roundish, worthy of a trial.

EARLY BEAUTY (Perfect): Plant a good grower, small, some rust, medium in productiveness; the fruit roundish, medium to small, good red but sour; very like to Excelsior.

EMPEROR AND EMPRESS (Perfect): Originated by the late J. Little, of Granton, Ontario, both have same origin; very like each other; plant a strong, healthy grower; medium in productiveness; very like the old Jessie; berry large of good quality.

FAIRFIELD (Perfect): Plant good grower, quite productive, did well with me, seems to be a good early kind; berry is above medium size, somewhat irregular, promises well as an early.

FREMONT WILLIAMS (Perfect): From Hubach and Hathaway. Plant large and healthy, a good runner, productive, medium to late; berry large, double at nose, of good quality, worthy of a trial.

FLORETTA (Perfect): Seedling of Bubach by Dr. Brown, Ia. Plant strong and heathy, a good grower and plant maker, productive; berry large, some of them double, a good bright scarlet, quality good, fine for eating out of hand: worthy of a trial.

FORD (Perfect): From Arkansas. Plant a good runner; berry round, scarlet, medium size, of good quality; fairly productive.

GENERAL DE WET (Imperfect): Introduced by L. C. Keoitt of N. J. Seedling of Bubach and Parker Early; plant like Bubach; berry large, somewhat soft, good color; not very productive.

Great Washington (Perfect): The plant is a fair grower with some rust, makes plenty of runners; the berry conical, scarlet, firm, of good quality and productive.

Glen Mary (Perfect): and **Gandy**, (Perfect): Both old standards, well known, did well with me.

Granville (Perfect): Plant very healthy, a strong and vigorous grower, supposed seedling of Minet's Prolific; berry large, roundish oblong, dark glossy red, seeds red, flesh solid and white inside, very good flavor; season medium to late.

Greenville (Imperfect): A second Bubach, did very well this year.

Howard (Perfect): From J. H. Black, N. J. Seedling of Barton's Eclipse and Gandy; the plant is strong, and healthy and productive, season late as Gandy; good color and firm; worth a trial.

Howard's No. 2 (Imperfect): Originated by late G. W. Howard of Michigan. Plant small, some rust, fairly vigorous; fruit roundish like Splendid; mild flavor, medium in productiveness, scarlet color, medium in size, will give further trial.

Howard's 96 (Perfect): By late G. W. Howard of Michigan. Plant healthy and strong, a good grower; berry is roundish conical, scarlet in color; medium firm, good quality, and fairly productive.

Ham (Perfect): Originated by J. H. Black of N. J. Plant a vigorous grower; very dark foliage, fairly productive of large berries; berry dark in color, smooth and firm, flesh deep red, good quality; worthy of a trial.

Howard's 103 (Imperfect): Originated by A. B. Howard of Massachusetts, not yet introduced, sent to me for trial. The plant is a good grower makes runners freely, very productive; berry is large, conical, dark scarlet, firm and good flavor, solid and white inside, seeds yellow, a good looking berry; ripe two days after Van Deman, a good market berry.

Howard's No. 7: Originated by A. B. Howard of Massachusetts, not yet introduced, did well with me this season; plant healthy, a good runner; berry conical, quite productive, very good quality.

Heflin's Early: Plant healthy, small medium grower; berry small, roundish, only medium in productiveness; another trial.

Haverland (Imperfect): Maintains its place at the front; it did well this season.

Irene (Imperfect): Did well this season, a good one.

Joe (Perfect): From J. H. Black, N. J. The plant is vigorous, foliage clean, and healthy, productive; the berry is large, bright red, obtuse conical and uniform in size, quality, good; season medium to late; a good one.

Kansas (Perfect): Plant a good grower, makes plants freely, healthy, medium in productiveness; berry good scarlet, firm and good flavor.

Kitty Rice (Imperfect): Plant a good grower, claimed to be a good market variety; it has only succeeded moderately with me.

Lyon (Imperfect): A good mid-season sort; berry dark glossy red, red seeds, flesh red, medium in firmness, flavor good, spicy, large, resembles Longfield; berry quite productive.

Latest (Imperfect): Plant is healthy, vigorous stools out; berry is large, conical, blunt at end, color good crimson, flesh red, medium firm, quality good; quite late; worth trial.

Louis Hubach (Imperfect): Sent out by Hubach and Hathaway. Plant small, fair runner, berry roundish flat, medium productiveness, medium quality, not much good.

Lucas (Perfect): Plant healthy, a good runner, and productive; berry, roundish conical, dark scarlet, medium firm, fair quality, medium in size, will give another trial.

Lester Lovett (Imperfect): Gandy under a new name.

Monitor (Perfect): A good early plant, good grower, healthy; berry large, round, medium firm, bright scarlet, worthy of trial for near markets.

Mrs. Fisher (Imperfect): Seedling of Hubach, and Sharpless by J. H. Black; plant good healthy grower; berry very large, late bright scarlet, medium firm, good quality, valuable for near market.

Mrs. Mark Hanna: Plant is large, some rust; berry large on vine; not desirable on acount of its rusting.

Mark Hanna (Imperfect) : Sent me by M. L. Thompson, of Virginia; a strong robust grower, and productive of large berries; good color; worthy of a trial.

Mrs. Miller (Imperfect: Plant is large and healthy, productive; berry medium to large, bright, long, good quality; worthy of a trial.

Morning Star: Did not do well; another trial.

Minute Man (Imperfect): Plant a good grower and productive; berry medium in size, regular conical, good red in color; not firm enough.

Margaret (Perfect): On rich ground this is one of the best; plant healthy; berry large, mostly conical, sometimes long, dark glossy red, and good quality; late season.

Marie (Imperfect): Seedling of Crescent plant; is healthy, a good grower; berry large, roundish, somewhat irregular, scarlet yellow seeds, medium firm, flesh pink somewhat sour but spicy; a good one.

New York (Perfect): See Armstrong, etc.

Oom Paul (Perfect): Plant large and healthy, a fair runner, medium productiveness; berry is large, somewhat irregular, dark red; did fairly well.

Olive's Pride (Perfect): Plant healthy medium in size, a good grower, very productive; berry resembles old Crescent in size and shape, of fair quality; season medium early; worth a trial for market.

Oscar's Early (Perfect): From Hubach and Hathaway, Arkansas. Plant healthy, great runner; berry small, shy bearer, of good quality.

Olympia (Perfect): Originated in California by W. M. Gray. Plant strong, some rust, a fair runner; berry light scarlet, seeds pink, resembles old Early Scarlet in appearance; of mild flavor, fairly firm, birds like them.

Parson's Beauty (Perfect): This standard did well; it is a good market berry; is being widely grown.

President (Imperfect): Plant large, but develops some rust, it did not do as well this year as last, its first fruiting. It is however, very highly spoken of in other places; I will give it a further trial.

Perfection (Perfect): Plant a good grower, some rust, a good runner and quite productive; berry conical, a good dark scarlet, medium firm, of good quality.

Peerless (Perfect): From Hubach and Hathaway, Arkansas. Plant large and strong, healthy, dark in color, a good runner; berry large, roundish, like Bismarck in appearance; good quality; worthy of a trial.

Prof. Fisher (Perfect): Seedling of Bubach and Sharpless, by J. H. Black, of N.J. Plant a strong grower, large and healthy, quite productive: berry large, resembles Glen Mary in shape, lighter color, of good quality, late.

Ridgeway (Perfect): Has been on the market for some years; plant is medium in size, stools somewhat; berry medium to large, dark red; does very well on some soils.

Ryckman (Perfect): Plant is healthy and a good runner, medium in productiveness; berry medium to large, with a neck roundish conical, mild flavor, good quality.

Sunny South (Perfect): Sent out by Hubach and Hathaway of Arkansas. Plant large, shows some rust, made a poor showing; berry of very good quality; a shy bearer not desirable.

Splendid (Perfect): One of the best medium earlies for market; well known now; needs no description.

Success (Perfect): Plant is strong and vigorous and healthy, and productive; berry medium to large, fairly firm: a good early.

Sample (Imperfect) Seaford (Imperfect): both well known; did very well; among the best.

Senator Dunlop (Perfect): Plant medium in size but a good strong grower and productive of large, fine berries like the old Wilson; firm, ships well; one of the best for market, medium early.

Sutherland (Imperfect) Did fairly well; good grower.

Superior (Perfect): Also did well.

Tennessee Prolific (Perfect): Good strong plant, a vigorous grower, very healthy; berry good, bright scarlet, firm and of good flavor; one of the best market varieties; has always done well with me.

Texas (Perfect): Is classed as an early variety; the plant is of good size, healthy, does not make as many runners as some, but sufficient; berry fair in size, red, firm and of fair quality; medium in productiveness.

Uncle Jim (Perfect), (See Armstrong): So like New York. Corsican, and others of same style; I see little or no difference; to describe one is to describe the whole class.

Uncle Sam (Perfect): Plant is strong, healthy and a good grower; medium in productiveness; berry good, red, yellow seeds, medium to large; firm and fair quality; did well with me and is highly spoken of in other places.

Velvet (Imperfect): Seedling of Bubach and Jessie by R. C. Cronk. of Wisconsin; made a poor showing with me the past season; plant appeared weak; I have reset and will give it another trial; it is said to have done very well in some other places.

Van Deman (Perfect): One of the best early sorts; does very well in some places, not so well in others; it runs through a long season, can be picked with the earliest, and some of the latest picked have been Van Deman; it is firm, very fine in appearance.

Wonder (Perfect), (or Sampsel's Wonder): Plant large, strong and healthy, a good runner and quite productive; berry large, conical, scarlet with red seeds, the berry has a neck, very good quality; well worth a trial by all growers, one of the best new ones, next to Cardinal with me; a good one judging from one season's trial.

Wilson (Perfect): The old Wilson did fairly well with me this season. did not have as much rust as usual.

Wm. Belt (Perfect): Not as much rust as usual, did well, a good runner, quite productive; the first berry is sometimes somewhat irregular, but the rest are of regular, conical shape, large and firm and a good quality; a good one to grow.

WILLIAMS (Perfect): WARFIELD (Imperfect): WOOLVERTON (Perfect): Are all so well known they need no description; they have all maintained their place at the front.

YANT (Perfect): A desirable variety; plant strong, vigorous and healthy, makes plants freely, quite productive; the berry is of large size, quite regular, with a neck, conical in shape, of good color, medium in season: worthy of a trial by growers.

New Trial Plot.

Several new varieties were received and planted in the trial plot for next year's fruiting, some of them have done very well in other places according to reports. They are as follows:

Abingdon: Almo: Boston Prize; Catherine; Commander; Duncan; Elma: Howard's No. 3: Laxton; Mrs. Miller; Mead: Himrod; North Shore; New Home: President Roosevelt; Reynolds; Three W's; Victor; Wild Wonder; Stevens' Late Champion. Of the above all have done well in the way of making plants, no rust as yet seen, Nov. 15. The *Three W's* and Wild Wonder have made the widest row. Victor is a grand plant, strong dark foliage and fine runner. Abingdon also has made a fine row of strong healthy plants; trust they may come through the winter well; I have given them a new lot of coarse manure.

LIST FOR GROWERS AND SEASON OF FRUITING.

Extra Early and Early.

Van Deman, Michel, Success: Cameron; Excelsior: Howard's No. 103; Johnson's Early: Beder Wood; Lord Sheffield; Clyde; Texas; Early Hathaway: Fairfield; Ham; Staples.

Mid Season.

Bubach: Haverland: Ben Davis: Sutherland: Splendid, Bismarck; Tennessee Prolific; Senator Dunlap; Parson's Beauty.

Mid Season to Late.

Glen Mary; Lyon; Marie, Saunders; Williams; Wm. Belt: Lovett; Brandywine; Emperor: Woolverton: President; Kitty Rice; Yant: Mrs. Fisher: Sample.

Late to Extra Late.

Joe: Gandy; Klondike: Nettie: Robbie; Aroma; Lester Lovett: Granville: Uncle Sam: Uncle Jim: Latest; Enhance: Howard's 96: Wonder; Perfection.

NOTES BY CHAS. YOUNG, RICHARD'S LANDING, ONT.

Strawberries have not been quite so profitable a crop as in some former years: just what the reason was I cannot say. They were kept clean, the weather was favorable, the berries set, but many did not mature. Our old standby Clyde was very nearly a failure. I think the plants are running out. Haverland again this year was the most profitable berry: with Brandy wine as a good second: these are both good berries with me. I never like to tell anyone what strawberries he should plant for profit. I plant in rows four feet apart and two feet in the rows, letting all runners grow, merely straightening them to keep in the row. Saunders and Williams are liable to have green tips with me, which spoil their appearance; they do not yield as well as some others; I have found it more profitable to take only one crop and turn them under.

I have never yet satisfied the local demand, although increasing the size of the plot every year. The crop of 1905 sold at 10c a box, or $1.00 per 10 quart basket. I have received this year for test the following:—Texas, all alive; Success, alive; August Luther, all dead; Monitor, Splendid, Tennessee Prolific; Senator Dunlap, Glen Mary, Joe, Sample, Parson's Beauty. They are all planted on uniform ground and I purpose to carefully note condition in spring; time of blossoming; freedom from rust; date of first and last picking; and yield per plant. I have twenty-four varieties under test. I discarded Rio, and Van Deman: I give no winter protection; I cultivate once in the spring, as soon as I can get the ground dry enough.

GENERAL NOTES.

Notes by Harold Jones, (*St. Lawrence Station*).

Apples: The climatic conditions of 1904-5 may be considered in every way favorable to fruit growers in this section, and trees that had suffered slight injury during the previous winter had every chance to recover their former vigor, and in most cases they have apparently done so. The fruit buds came through the winter in a healthy, normal condition and produced a perfect bloom that set fruit well. The crop was below medium in quantity which has left the trees in a healthy, vigorous condition for the winter now coming on. Insects were not very numerous, though codling moth did more damage than for several years past. "Spot" developed to an alarming extent late in August, and reduced a crop of otherwise perfect fruit by at least forty per cent. There were several causes that led to this sad condition of affairs such as almost entire freedom from "spot" in 1904; the low price of fruit; and the weakened condition of the trees, which all had a tendency to cause indifference, disappointment or disgust among the growers, resulting in very little or no spraying being done in 1905 until late in the season, where people began to realize that good apples would bring good prices. Then they began to spray but were too late to remedy the damage already done; all of which goes to show that there is still lack of appreciation of the fact that only good, clean, well grown fruit will pay any year, and that a high class product will give fair returns every season.

After several seasons of close observation I am confirmed in my opinion that cultivation of our apple orchards must not be continued past midsummer. When clean cultivation is practiced and continued up to the 1st of August, followed by a cover crop, the growth of new wood is continued so late in the season that it goes into winter in a green, sappy condition and serious injury is the result; and, more than that, the cover crop is very scanty and leaves the ground and root system in a bare and unprotected condition.

Cultivation should cease and the cover crop be sown by the first of July; then you will get well ripened, hard shelled fruit bud and the terminals of the new growth will be ripened before winter sets in, thus placing the tree in the best possible condition to withstand temperatures of 25 to 30 degrees below zero, such as we are liable to have in this section some years.

I think this question of cultivation of orchards and when it should cease, in order to obtain the best results in hardiness of tree and bud, keeping in mind the results on the growing crop of fruit, should be given careful study and thought by the experimenters in the different sections of the Province, which would result in a better knowledge of the requirements of each section and would do away with the too broad question of to-day in many sections: cultivation *versus* sod in orchards.

PEARS AND PLUMS: As will be seen by my report of 1904, were nearly all injured or killed by the freeze of that year and it is safe to say that they can never be grown here in a commercial way; although a few varieties give promise of being satisfactory for the home garden. The detailed report on varieties will show the results of this year's experiments.

SOUR CHERRIES were very satisfactory this year and gave fair crops; further experiments along this line will probably result in my being able to give a satisfactory list for the home garden with possibly some commercial value.

NOTES BY A. W. PEART, (*Burlington Station*).

The varieties of fruits here are divided as follows:—

Apples	67	Blackberries	22
Pears	46	Raspberries	2
Plums	54	Currants	30
Peaches	13	Gooseberries	6
Cherries	11		
Grapes	30		281

The fruit crop in the Burlington district was good, and, with the exception of the more tender varieties of blackberries, all fruits passed the winter in excellent condition. The season was favorable, plenty of moisture and sufficient heat. Growth of wood has been, perhaps, too abundant. Insects were numerous, but fungi were below the average. Power spraying is becoming quite general.

APPLES were an average crop of excellent quality. The codling moth was plentiful, but spots were scarce. Prices were good.

PEARS were a light crop. A severe frost about May 23rd, when some of the leading varieties were in full bloom, so injured the blossoms, that there were but few Anjou and Duchess. Clapp's Favorite, Bartlett, Kieffer, Winter Nelis, Josephine, Giffard, Wilder, however, gave a good yield. Prices were fair.

PLUMS were a moderate crop. Many of the European varieties, such as Lombard, Yellow Egg, Reine Claude, and Imperial Gage suffered considerably from rot. Bradshaw, Niagara, Glass and the Japan varieties were, however, comparatively exempt. The latter class gave a heavy yield of good fruit. The curculio did not work much injury.

PEACHES were a good crop of excellent quality. The peach curl cut no figure.

CHERRIES were a fair crop, and sold at high prices.

GRAPES were a good crop of excellent quality. There was practically no rot nor disease among them. The vineyards were sprayed three times, twice with Bordeaux, and the last time with the ammoniacal solution of copper corbonate. Prices ranged from 2 to 5 cents per lb.

BLACKBERRIES were a fair crop. The tender varieties were injured by the winter and gave but little fruit.

RASPBERRIES were a good crop of excellent quality.

CURRANTS gave an average yield at advanced prices.

GOOSEBERRIES were an average crop. There was little mildew, and prices ruled higher than usual.

NOTES BY A. E. SHERRINGTON, (*Lake Huron Station*).

The winter of 1904-5 was not so severe as the previous one, still quite a number of plum, cherry and apple trees were killed, owing to their weakened condition from the previous winter. The spring opened very favorably; all trees and plants that had not been damaged previously, came out in fine condition. Later on, where the trees were in full bloom, cold, heavy rains set in, making spraying very difficult and causing trees that were weak, and orchards that were not cultivated, to cast all their fruit; hence the apple crop in this district was nearly a total failure. Plums were very good, and the crop was all harvested and sold at fair prices.

Pears were a light crop, but not much grown in this district. The young pear plantation at this station has not come into bearing yet, but the trees are doing well.

Cherries were very good, with good demand and good prices.

All small fruits were excellent, with the exception of black currants. Not much planting was done at this station last spring. A few trees of new varieties were added to the already large list of fruits. As none of the young apple trees fruited this season, no report can be given as to yield.

The experiments that are being conducted at this station in regard to the working of tender and more suitable varieties on hardy stalks are doing nicely.

York Imperial is grafted on Barry; Stark on Alexander; Spy on Tolman; King on Tolman; Baldwin on Tolman; and Baldwin on Ribston.

In pears, I am working Bartlett-Seckel on Kieffer; Duchess on Kieffer; Louise on Kieffer; and have a number of Kieffers planted with a view of grafting other desirable varieties on them. Under this method we will in a few years be able to have something definite as to whether certain varieties will do best by working on their own stocks, or will be improved on hardy stocks.

All undesirable varieties of young apple trees will be worked over as soon as a thorough test has been made. Clean cultivation is practiced success.

Nearly all varieties of apples do well in this district, but all have not throughout the plantation, believing it the only method that will bring

NOTES BY JOHN MITCHELL, (*Georgian Bay Station*).

This has been a most discouraging year for fruit growing in this district. The winter was unusually severe, following the extreme cold of the previous winter, which killed half the plums, nearly all the peaches, many of the cherries and young Baldwin apple trees, and weakened many more so much that hundreds have died this past summer, after showing a few weak leaves and blossoms. In our own plantation of over twelve hundred trees there are only two or three hundred left. I don't expect that we will have a real good crop of plums here again till we have new orchards. Most people seem rather pleased than otherwise. Plums have been so cheap for years that they were quite unprofitable.

In apples there is the lightest crop ever gathered in this district since fruit growing became a business. Although the spring opened early it soon became cold and wet for a long period about blossoming time. There was scarcely a day of sunshine. It was so cold the bees could not work, and too wet for the winds to carry the pollen which seems to be almost completely washed out. Not more than ten per cent. of a crop set and that not the best, which made it very expensive to gather and pack apples this fall.

Cherries were about half a crop and the quality was only fair.

Pears also were about half a crop; in some places the quality was very good, but generally rather poor.

Bush fruits were fairly good, being well covered with the deep snow during the hardest part of last winter.

Notes by G. C. Caston, (*Simcoe Station*).

There is little that is new to report this year. The full effect of the severe winter of 1903-4 was not fully realized until this year. Many trees were so badly injured, that they have since succumbed and we may be sure that anything that stood the test of that year may be classed as hardy enough for the locality in which they are growing. The varieties injured, but not killed, were; Ontario, Baldwin and Spy. The top grafted trees stood by far the best. A few Baldwin top grafted and a few Ontario, also top grafted, were injured slightly; but Spy top grafted was not injured at all. So I see no reason why I should not continue to preach the gospel of top grafting the best commercial apples upon good, healthy, hardy stocks.

The crop of apples throughout this district this year was below the average as to quantity and the quality was fair. Insect pests, with the exception of Codling Moth, were not troublesome, there was no injury from leaf eating insects at all. There is little or no injury from Borers in this district. This may be owing to the fact that Woodpeckers are quite plentiful here. The fungus scab is bad on some varieties of apples, and is quite likely to continue as nothing is being done by the majority of growers to prevent. Most of the orchards are small and generally neglected as to pruning and spraying. This is a stock county, generally speaking, and very few make a specialty of fruit growing. But, on the rolling lands of this County, where the soil is good, apples of the very finest quality can be produced, and we can do fairly well with several varieties of pears.

Experience teaches valuable lessons as the years go by, and I am convinced that in addition to pruning, spraying and cultivation, we have the still more important problem of fertility to deal with, feeding the trees a balanced ration. This matter does not receive the attention it deserves. I usually pack a few cars of apples every year, and have observed a good many orchards. I find that where the fertility is right the fruit is good, even where the other conditions of pruning and spraying are either entirely neglected or imperfectly done. There is the key note of successful fruit growing, the great unsolved problem with most of us, viz.,—Feeding the trees a balanced ration. Where the orchard is manured at all, it is with stable or barnyard manure; and, while I admit that there are hundreds of orchards that would be vastly benefited by a liberal dressing of it, yet it is not by any means a balanced ration for a fruit tree. There is too great a preponderance of nitrogen. This, especially in cold climates, should take second place and potash and phosphatic manures stand first in importance, in order to build up a healthy, well balanced tree. Such a tree properly nourished, will bear perfect fruit of the best quality, while a fertilizer with an excess of nitrogen has the effect of producing a rampant wood growth which is sure to suffer severely in such winters as that of 1903-4. And I am convinced that by the exercise of good judgment in the proper fertilizing of orchards, we can do a great deal to prevent the damage by excessively cold winters such as that of 1903-4.

APPENDIX I.

FRUITS RECOMMENDED FOR PLANTING.

IN VARIOUS PARTS OF THE PROVINCE OF ONTARIO, AFTER CAREFUL TESTS OF VARIETIES MADE AT THE VARIOUS FRUIT EXPERIMENT STATIONS.

General Lists. After testing a large number of varieties of fruit at the various fruit stations, the Board of Control has decided upon the following as the most desirable for general planting.

District Lists. The District Lists given by the various experimenters show varieties especially adapted to the sections represented by their stations.

The term *Commercial* is intended to include the varieties most desirable for market purposes and the term *Domestic* those most desirable for home uses, either cooking or dessert.

These lists are given, as far as possible, in the order of ripening.

It is realized that there are many varieties not included in these lists which may do well *under special* conditions, yet which are generally not considered as desirable as those mentioned.

The Board of Control recognizing the great disadvantage which faces inexperienced persons who desire to engage in fruit growing for profit, because of the very large and confusing list of varieties, has ordered the publication of select lists of tested varieties which shall serve as a guide to intending planters.

APPLES.

General List of the most Valuable Varieties for Market Approved by the Board of Control.

Summer.

Astrachan: Adapted to all sections except the extreme north.

Duchess: Adapted to all sections.

Fall.

Gravenstein: Adapted to all sections except the St. Lawrence River and other northerly portions of the Province.

Wealthy: Particularly valuable for northern sections.

Alexander: Especially for northern sections.

McIntosh: Adapted especially to the St. Lawrence River district, but can be grown over a much wider area.

Fameuse: Adapted especially to the St. Lawrence River district, but succeeds well over a much wider area.

Blenheim: Adapted to all sections except the St. Lawrence River district and other northerly portions of the Province.

Winter.

King: Adapted only to the best apple sections, and succeeds best when top grafted on hardy stocks.

Hubbardston: Adapted to the best apple sections.

Greening: Adapted to the best apple sections.

Baldwin: Succeeds best on clay land, and is adapted to the best apple districts.

Northern Spy: Adapted to the best apple districts, but can be grown with success farther north by top-grafting on hardy stocks. This is also a good method of bringing it into early bearing.

Ontario: An early and abundant bearer, but short lived. Recommended as a filler among long lived trees. Adapted to same districts as Northern Spy, which it somewhat resembles.

Stark: Adapted to best apple districts.

Varieties Especially Adapted to Home Use.

Summer.

Transparent: Adapted to all sections.
Primate: Adapted to best apple sections.
Sweet Bough: Adapted to best apple sections.
Duchess: Adapted to all sections.

Fall.

Chenango: Adapted to best apple sections.
Gravenstein: Adapted to best apple sections.
Wealthy: Especially adapted to northern sections.
McIntosh: Especially adapted to northern sections.
Fameuse: Especially adapted to northern sections.
Blenheim: Adapted to best apple sections.

Winter.

King: Adapted to best apple sections. Should be top grafted.
Wagener: Adapted to best apple sections.
Swayzie: Adapted to all sections except most northerly.
Greening: Adapted to best apple districts.
Tolman: Adapted to best apple districts.
Northern Spy: Adapted to best apple districts, but will succeed farther north if top grafted.
Mann: Adapted to best apple districts, but will succeed farther north if top grafted.

Hardy Varieties for Sections North of Latitude 46 Degrees.

Summer.

Yellow Transparent, Charlamoff.

Fall and Winter.

Duchess, Wealthy, Hibernal, Longfield, Patten, Whitney, Hyslop, Scott Winter.

Crabs Suitable for the Whole of the Province.

Whitney: A large crab of high quality, suitable for planting in the extreme north where other apples will not succeed. May be used for dessert or cooking.

Martha: An early crab of fair quality.
Transcendent: Yellowish crab, season early autumn.
Hyslop: Dark, rich, red crab, of late season, quality only fair.

District Lists, Recommended by the Experimenters.

Niagara District.

Commercial: Astrachan, Duchess, Gravenstein, Alexander, Blenheim, Cranberry, Hubbardston, King, Greening, Baldwin, Spy.

Domestic: Early Harvest, Sweet Bough, Duchess, Chenango, Gravenstein, Shiawassee, Fall Pippin, Fameuse, Swayzie, Wagener, Yellow Bellflower, Esopus (Spitzenburg), Tolman.

Bay of Quinte District.

Commercial: Duchess, Gravenstein, Trenton, Alexander, Wealthy, Fameuse, McIntosh, King, Greening, Baldwin, Ontario, Seek, Spy, Tolman, Ben Davis, Stark.

Domestic: Benoni, Primate, Gravenstein, Fameuse, McIntosh, Grimes, Greening (R.I.), Ontario, Spy, Tolman, Swayzie.

Burlington District.

Commercial: Astrachan, Duchess, Wealthy, Ribston, Blenheim, King, Greening, Baldwin, Spy.

Domestic: Astrachan, Sweet Bough, Gravenstein, Wagener, Seek, Golden Russet.

Lake Simcoe District.

Commercial: Duchess, Peerless, Alexander, Wolf, Blenheim, Pewaukee, Stark, and the following if top-worked on hardy stocks: Greening, King, Ontario, Baldwin, Spy.

Domestic: Astrachan, Primate, St. Lawrence, Fameuse, McIntosh, King, Spy.

Lake Huron District.

Commercial: Astrachan, Duchess, Wealthy, Fameuse, McIntosh, Blenheim, Greening, Baldwin, Spy, Golden Russet, Ben Davis.

Domestic: Transparent, Astrachan, Duchess, McIntosh, Grimes, Blenheim, King, Spy, Golden Russet.

St. Lawrence District.

Commercial: Duchess, Alexander, Wolf, Scarlet Pippin, Fameuse, McIntosh, Baxter, Milwaukee, Golden Russet.

Domestic: Transparent, Brockville Beauty, Scarlet Pippin, Fameuse, McIntosh, Blue Pearmain, Golden Russet, Yellow Bellflower.

Algoma District.

Commercial and Domestic: Astrachan, Transparent, Duchess, Charlamoff, Gideon, Longfield, Wealthy, Scott Winter.

BLACKBERRIES.

General List, Approved by the Board of Control.

Agawam, Snyder, Eldorado, and for southern sections, Kittatinny.

District Lists, Recommended by the Experimenters.

Burlington District.

Commercial and Domestic: Snyder, Ancient Briton, Western Triumph, Agawam, Taylor.

Lake Simcoe District.

Commercial and Domestic: Agawam, Eldorado.

CHERRIES.

General List, Approved by the Board of Control.

Hardy: Orel 25, Orel 24, Early Richmond, Montmorency, Russian 207.

District Lists, Recommended by the Experimenters.

Niagara District.

Commercial: Wood, Knight, Napoleon, Tartarian, Dyehouse, Montmorency, Late Duke, Elkhorn, Windsor, English Morello.

Domestic: May Duke, Cleveland, Knight, Elton, Tartarian, Hortense, Choisy, Black Eagle, Mezel, Royal Duke.

Lake Simcoe District.

Commercial and Domestic: Orel 24, Ostheim, Lithaur, Russian 207, Bessarabian, Dyehouse, English Morello.

Algoma District.

Commercial and Domestic: Early Richmond, Montmorency, English Morello.

Bay of Quinte District.

Commercial and Domestic: Early Richmond, Montmorency.

St. Lawrence District.

Commercial and Domestic: Early Richmond, Montmorency, Orel 24, English Morello.

CURRANTS.

General List, Approved by the Board of Control.

Black: Black Victoria, Champion, Lee, Naples, Saunders.
Red: Cherry, Fay, Pomona, Red Cross, Victoria, Wilder.
White: White Grape.

District Lists, Recommended by the Experimenters.

Burlington District.

Commercial:
Black: Lee, Naples, Saunders.
Red: Cherry, Fay, North Star, Prince Albert, Victoria, Wilder.
White: White Grape.

Lake Huron District.

Black: Champion, Naples, Saunders.
Red: Pomona, Red Cross.

GOOSEBERRIES.

General List, Approved by the Board of Control.

Pearl, Downing, Red Jacket. Whitesmith is one of the best English varieties, but is almost valueless on some soils and in some localities owing to mildew.

GRAPES.

General List, Approved by the Board of Control.

Commercial and Domestic:

Black: Moore, Campbell, Worden, Concord, Wilder.
Red: Delaware, Lindley, Agawam, Vergennes.
White: Niagara, Diamond.

For Northern Sections:

Black: Champion, Moore, Campbell, Worden, Wilder.
Red: Moyer, Brighton, Delaware, Lindley.
White: Winchell, Diamond.

District Lists, Recommended by the Experimenters.

Wentworth District.

Commercial:

Black: Champion, Moore, Campbell, Worden, Concord.
Red: Delaware, Lindley, Agawam, Vergennes, Catawba.
White: Niagara, Diamond.

Domestic:

Black: Black Delaware, Early Dawn.
Red: Jefferson, Mills.
White: Winchell, Golden Drop.

Niagara District.

Domestic: Moyer, Campbell, Worden, Delaware, Lindley, Brighton, Wilder, Agawam, Requa.

PEACHES.

General List, Approved by the Board of Control.

Commercial:

Sneed: Whitefleshed, clingstone, quality only fair, earliest of all.
Alexander: Whitefleshed, clingstone.
Hynes: Whitefleshed, semi-cling, quality good.
St. John: Yellowfleshed, freestone, quality good.
Mountain Rose: Whitefleshed, freestone, quality very good.
Early Crawford: Yellowfleshed, freestone, quality very good.
Champion: Whitefleshed, freestone, quality very good, for home use or near markets.
Brigdon: Yellowfleshed, freestone, quality good.
Fitzgerald: Yellowfleshed, freestone, quality very good.
Reeves: Yellowfleshed, freestone, quality fair, large size.
Elberta: Yellowfleshed, freestone, quality fair, good for long distance shipments.
Oldmixon: Whitefleshed, freestone, quality good.
Stevens: Whitefleshed, freestone, quality good.
Smock: Yellowfleshed, freestone, quality fair, very late, good shipper.

Domestic:

Hynes, St. John, Early Crawford, Oldmixon, Longhurst, Stevens.

District Lists, Recommended by the Experimenters.

Niagara District.

Commercial: Sneed, Alexander, Greensboro, St. John, Early Crawford, New Prolific, Champion, Elberta, Willet, Smock.

Domestic: Rivers, Hynes, St. John, Early Michigan, Lewis, Crosby, Champion, Reeves, Wonderful, Jacques Rareripe, Wheatland, Longhurst.

Essex District.

Commercial: Alexander, St. John, Brigdon, Early Crawford, Fitzgerald, New Prolific, Engol, Elberta, Golden Drop, Kalamazoo, Banner, Smock.

Domestic (Whiteflesh): Alexander, Mountain Rose, Oldmixon, Stevens.

(Yellowflesh): St. John, Early Crawford, Fitzgerald, New Prolific, Engol, Crosby, Golden Drop, Banner.

PEARS.

General List, Approved by the Board of Control.

Commercial: Giffard, Clapp, Bartlett, Boussock, Flemish (hardy, subject to spot), Howell, Louise, Duchess, Bosc, Clairgeau Anjou.

Domestic: Summer Doyenne, Giffard, Bartlett, Flemish (for the north), Sheldon, Seckel, Bosc, Anjou, Lawrence, Josephine, Winter Nelis.

District Lists, Recommended by the Experimenters.

Niagara District.

Commercial: Chambers, Wilder, Giffard, Clapp, Bartlett, Hardy, Bosc, Howell, Louise, Duchess, Pitmaston, Clairgeau, Anjou, Easter Beurre.

Domestic: Doyenne, Manning, Giffard, Boussock, Rosteizer, Marguerite, Sheldon, Seckel, Triumph, Ritson, Louise, Hardy, Diel, Anjou, Lawrence.

Burlington District.

Commercial: Wilder, Clapp, Bartlett, Boussock, Louise, Duchess (dwarf), Anjou, Kieffer, Winter Nelis, Easter Beurre.

Domestic: Wilder, Bartlett, Louise, Anjou, Winter Nelis.

Bay of Quinte District.

Commercial and Domestic: Giffard, Tyson, Clapp, Boussock, Hardy, White Doyenne, Dempsey, Bosc, Clairgeau, Goodale, Lawrence, Josephine.

St. Lawrence District.

Domestic: Clapp, Flemish, Ritson.

PLUMS.

General List, Approved by the Board of Control.

Commercial and Domestic:

American: These are extremely hardy and are desirable where the European and Japanese varieties cannot be grown: Aitkin, Cheney, Bixby, Mankato, Wolf, Hawkeye, Stoddard.

European: Bradshaw, Imperial Gage, Gueii, Shipper's Pride, Lombard (liable to over bear, requires thinning), Quackenboss, Yellow Egg, Grand Duke, Golden Drop (Coe), Reine Claude (one of the best for canning).

Japanese: These are apparently quite as hardy as the European varieties: Red June, Abundance, Burbank, Chabot, Satsuma (red fleshed, desirable for canning).

District Lists, Recommended by the Experimenters.

Lake Huron District.

Commercial and Domestic: Red June, Ogon, Burbank, Bradshaw, Imperial Gage, Gueii, Shipper's Pride, Victoria, Quackenboss, Yellow Egg, Monarch, Grand Duke, Satsuma.

Georgian Bay District.

Commercial and Domestic: Red June, Burbank, Washington, Bradshaw, Imperial Gage, Quackenboss, Arch Duke, Diamond, Monarch, Yellow Egg, Golden Drop (Coe), Satsuma, Reine Claude.

Burlington District.

Commercial:

European: Bradshaw, Niagara, Imperial Gage, Lombard, Yellow Egg, Glass, Reine Claude.

Japan: Red June, Abundance, Burbank, Chabot, Satsuma.

Domestic: Abundance, Saunders, Bradshaw, Imperial Gage, Smith, Orleans, Lombard, Yellow Egg, Satsuma, Reine Claude.

Niagara District.

Commercial: Red June, Burbank, Bradshaw, Chabot, Gueii, Golden Drop (Coe), Quackenboss, Satsuma, Reine Claude.

Domestic: Abundance, Washington, Yellow Egg, Shropshire, Quackenboss, Satsuma, Reine Claude.

St. Lawrence District.

Domestic:

European: Gueii, Lombard, Shipper's Pride, Glass.
Japan: Red June, Burbank.
American: Milton, Whitaker, Hammer.

QUINCES.

General List, Approved by the Board of Control.

Fuller, Orange (the leading market variety in Ontario), Champion (for Southern Ontario only as it ripens too late for other sections).

RASPBERRIES.

General List, Approved by the Board of Control.

Black: Hilborn, Older, Gregg, Smith Giant.
Purple: Columbian, Shaffer.
Red: Marlboro, Herbert, Cuthbert.
White: Golden Queen.

District Lists, Recommended by the Experimenters.

Lake Huron District.

Commercial and Domestic:

Black: Hilborn, Conrath, Older.
Purple: Columbian, Shaffer.
Red: Marlboro, Herbert, Cuthbert.

STRAWBERRIES.

General List, Approved by the Board of Control.

Commercial: Splendid (Perfect), Bederwood (P.), Warfield (Imperfect), not suited to light sandy soil, Greenville (Imp.), Williams (P.), Saunders (P.), Sample (Imp.), Irene (Imp.), Buster (Imp.).

Domestic: Van Deman (P.), Splendid (P.), Excelsior (P.), Senator Dunlap (P.), Ruby (P.), Bubach (Imp.), Irene (Imp.), Belt (P.), Lovett (P.).

NOTE.—In selecting varieties for planting, perfect-flowered varieties should be included to fertilize those having imperfect flowers.

APPENDIX II.

UNDESIRABLE VARIETIES OF FRUIT FOR COMMERCIAL ORCHARDS,

In the Various Fruit Districts, as Proven by Tests Made at the Various Fruit Stations of Ontario.

Apples.

Niagara District: Blue Pearmain, Canada Baldwin, Cooper's Market, Early Harvest, Early Strawberry, Esopus Spitzenberg, Fall Pippin, Fameuse, Golden Sweet, Beauty of Kent, Keswick Codlin, Lady, Maiden Blush, St. Lawrence, Swaar, Vandevere, Yellow Bellflower, Yellow Transparent.

Bay of Quinte District: Archer, Akin, Barry, Baxter, Beauty of Kent, Blunt, Barcelona Pearmain, Cabashea, Canada Reinette, Cellini, Carlough, Dora, Ella, Eicke, Green Fameuse, Golden White, Grand Sultan, Haas, Hastings, Hawley, Highland Beauty, Hurlburt, Haskell Sweet, Hamilton, Isabella, Isham, Lady, Lady Henniker, Lady Sweet, Lawver, Landsfinger Reinnette, Maggie, Magog Red Streak, Mountain Tulip, Mountain Beet, Newtown, Norcaster Spy, Plumb's Cider, Powell, Pioneer, Rawles Janet, Royal Russet, Rivers Winter Peach, Rochelle, Scott Winter, Sops of Wine, Stump, Switzer, Scott Russet, Starr, Utter Red, Wine Sap, Winter St. Lawrence, White Winter Pearmain, Willow Twig, White Pippin, Winter Fameuse, Walbridge, Whinnery.

Burlington District: Holland Pippin, Snow, Pewaukee, Keswick Codlin, Rambo, Cranberry Pippin.

Lake Huron District: Alexander, Barry, Cayuga, Colvert, Early Harvest, Early Joe, Fall Jenneting, Fall Pippin, Gideon, Haas, Hawley, Keswick Codling, Lowell, Maiden's Blush, Pomme Grise, Pound Sweet, Rambo, Swayzie, Sour Bough, Tetofsky, Walbridge, Wine Sap, Wolf River.

St. Lawrence District: Aikens Red, Blenheim Pippin, Chenango, Dartmouth crab, Excelsior crab, Gideon, Hurlburt, Hibernal, Longfield, Late Strawberry, Mann, Magog Red, Ontario, Orion crab, Palouse, Peach of Montreal, Roman Stem, Salome, Sutton Beauty, Switzer, Shackleford, Waxon crab, Wine Sap, Yates Red.

Algoma District: Blenheim (tender), Ben Davis (sun scalds), Baldwin (very tender in trunk and top), Cranberry Pippin (tender), Greening, Mann (tender both in top and trunk), Rolf, Stark (sun scalds), Sweet Bough, Spy.

Blackberries.

Burlington District: Early Cluster, Early Harvest, Early King, Dorchester, Gainor, Humboldt, Lovett's Best, Maxwell, Minnewaski, Ohmer, Wachusetts, Wilson Junior.

Cherries.

Niagara District: Early Purple, Elton, Yellow Spanish, Choisy, Black Eagle, Ostheim, Vladimir, Mazzard, Amber, Rockport.

St. Lawrence District: Governor Wood, Black Knight, May Duke, Olivet, Reine Hortense.

Currants.

Burlington District: Belle de St. Giles, Brayle Seedling, New Victoria, Raby Castle, Red Dutch, Versailles, White-Imperial.

GRAPES.

Niagara District: Bacchus, Clinton, Diana, Dracut Amber, Duchess, Early Dawn, Eumelan, Faith, Goethe, Hartford, Isabella, Ives, Mills, Noah, Pocklington, Telegraph.

PEACHES.

Niagara District: Amsden, Barnard, Early Purple, Early Rivers, Triumph, Late Crawford, Lemon Cling, Morris White, Wager, Bowslaugh, Kalamazoo.

PEARS.

Niagara District: Brandywine, Buffum, Dearborn, Elizabeth, Flemish Beauty, Idaho, Jones, King Sessiny, Koonce, Lawson, Le Conte, Mount Vernon, Onondaga, Osband, Pound, Tyson, Vicar, White Doyenne.

Burlington District: Buffum, Flemish Beauty, Idaho, Petite Marguerite, President Drouard, Sudduth, Summer Doyenne.

St. Lawrence District: Bartlett, Seckel, Beurre Clairgeau, Bessemianka, Bergamot, Beurre Hardy, Cherburn, Dempsey, Goodale, Japan Golden Russett, Howell, Idaho, Lincoln, Lincoln Coreless, Le Lecture, Varonish, Vermont Beauty, Winter Pear.

PLUMS.

Georgian Bay District: Admiral De Riany, Becksley, Berckmans, Brunswick, Czar, Copper, Communion, Chas. Downing, Comfort, Cheney, Forest Rose, Golden Cherry, Hattankio, Hammer, Hungarian Prune, Milton, Maru, Normand, Ogan, Orange Prune, Pottawattamie, Saunders, Tatge, Ungarish, Willard, Wild Goose, Wolf, Whitaker, Wyant, Youkin's Golden; and to these might be added General Hand for its poor bearing.

Burlington District: Weaver, Fellenberg, Marianna, Czar, Shropshire.

St. Lawrence District: Abundance, Blood No. 4, Burbank, Berckmans, Communia, Chabot, Charles Downing, Coe's Violet, Forest Garden, Green Gage, Gold, Grand Duke, Hughes' Seedling, Hatankio, Kelsey, Lombard Improved, Large Golden, Muir, Montreal, Moore Arctic, Normands, Pond Seedling, Satsuma, Saunders, Tatge, Wickson, Yellow Egg.

RASPBERRIES.

Lake Huron District: Brandywine, Caroline, Miller, Reliance, Thompson, Turner.

REPORT

OF THE

Inspector of Fumigation Appliances

1905

(PUBLISHED BY THE ONTARIO DEPARTMENT OF AGRICULTURE, TORONTO.)

PRINTED BY ORDER OF
THE LEGISLATIVE ASSEMBLY OF ONTARIO

TORONTO:
Printed by L. K. CAMERON,
Printer to the King's Most Excellent Majesty
1906.

WARWICK BRO'S & RUTTER, Limited, Printers
TORONTO

To the Honourable WILLIAM MORTIMER CLARK, K.C.,

Lieutenant-Governor of the Province of Ontario.

MAY IT PLEASE YOUR HONOUR:

The undersigned begs to present herewith for the consideration of Your Honour the Report of The Inspector of Fumigation Appliances.

Respectfully submitted,

NELSON MONTEITH,

Minister of Agriculture.

TORONTO, 1906.

REPORT

OF THE

Inspector of Fumigation Appliances

1905.

To the Honorable the Minister of Agriculture:

SIR,—I beg to submit herewith the annual report of the Inspector of Fumigation Appliances for the year 1905:

During the spring and fall of 1905 the usual inspections were made of the fumigation houses and appliances of the nurseries of the Province. Owing to the early starting of the spraying demonstrations, which had been decided on by the Department, an assistant, Mr. W. E. A. Peer, of Freeman, was appointed to help in the fumigation work. Mr. Peer visited the nurseries in the eastern and central counties, including Toronto, and also the following points in the south and west, viz., Hamilton, Fruitland, Bartonville, Scotland, Lakeview, St. Thomas, Strathroy, Goderich, Bright and Wellburn. I append a brief report from him on the nurseries at these points.

The larger nurseries of the Niagara District were inspected by myself in both spring and fall. Wherever necessary, several visits were paid to the same place, as my work would permit. As the scale is in most evidence south of the mountain ridge running through this section, the greatest vigilance is necessary to keep the nurserymen there up to the mark in carefully fumigating all stock sent out. The temptation is strong to occasionally send out small shipments of stock which are wanted in a hurry without troubling to put them through the fumigation house. It shows well for the honesty of the nurserymen of this Province and the efficiency of the fumigation law, that up to this date, no infestation of scale has been traced to nursery stock sent out in recent years.

In addition to the nurseries in this district, I visited the two important Dominion Stations at Niagara Falls and Windsor. Owing to the employment at these points of permanent superintendents, the houses are always kept in a high state of efficiency, and the work of fumigating the stock is well and expeditiously done. Inspection was made also at London, Leamington, Ruthven, Port Elgin, Owen Sound, Meaford and Wellington.

In the vicinity of Ruthven the scale is spreading quite rapidly and already threatens the nursery of Cady & Son at that point. Very little attempt has been made in these western districts to spray the orchards, which are often in bad condition. The peach orchards were almost wiped out by the previous bad winter, and the apple orchards, owing to various reasons, have not been profitable, and are, therefore, being neglected. An exception to this general statement is furnished by the members of the Chatham Fruit Growers' Association, who are energetically and successfully fighting the scale with the aid of power sprayers and crude oil obtained from neighboring wells.

Owing to the prevalence of the scale in the immediate vicinity of many of our largest nurseries, I would recommend that a number of permanent officials be appointed to overlook the nurseries in their immediate neighborhood. The expense need not be very great, as the work could be easily performed during four months of the year, and not more than four such local inspectors need be chosen. With one man each at Leamington, St. Catharines, Fonthill and Winona, the scale infested districts could be quickly covered in any direction, the fumigation houses and nursery stock be under constant supervision, and accurate reports of the scale infestations be made from month to month. The present method of compelling the nurseryman to pay the inspector for the time he is superintending the work is not in the best interests of either party.

In general the fumigation houses show that their owners are trying to keep them in good repair. Those houses with inside plastered walls and single doors are standing the wear best, and are by far the tightest when tested with the smoke. The use of narrow strips of saddler's felt on all openings, whether doors or ventilators, has proved the best available method of rendering these places gas tight.

Many of the smaller nurseries are using various types of fumigating boxes These are not as a rule as permanent nor as safe as the houses. They are very apt to be neglected during the ten or eleven months of the year when not in use, and seem to open easily from the effects of the snow and rain to which they are usually exposed. Where buried in the ground, their usefulness is increased, as leakage is practically impossible, but on the other hand, the life time of the wood is considerably reduced.

Mr. Peer reports as follows on the houses visited by him in the spring :—

Webster Bros., Hamilton. House newly repaired ; when tested it leaked slightly. Owner promised to try to overcome this. Before another season he intends moving a small barn that he has and fix one end of it for a fumigator.

Fruitland Nursery Co., Fruitland. House leaked very slightly around ventilator, owing to the crack in the paper which was pasted over it Owner pasted another thickness of paper over it. He also thought of building a new house for next season.

B. Galbraith. House in good shape. Has no stock for next season.

Ward Bros., Bartonville. House in good shape, except small leak at the corner of inside door, which owner was ordered to fix with a strip of felt.

Hunter & Son, Scotland. Fumigating house apparently in good shape. He had only a small amount of stock to fumigate this season, as a considerable portion of his trees had been destroyed by mice and rabbits. I made a careful examination of the saleable trees and could find no trace of any injurious pests.

H. L. McConnell, Lakeview. Practically no smoke escaped from the house during the test. Has sufficient chemicals on hand for this season.

A. W. Graham, St. Thomas. Box not in shape. Owner had only a small amount of stock and did not intend to fumigate it. I tested the box and found that it needed repapering and painting at the ends. He had sufficient chemicals on hand and was ordered to comply with the regulations, and I warned him of the consequences if he did not obey the law.

Strathroy Nursery Co., Strathroy. Fumigation all done. Box in perfect order.

Estate of J. Stewart, Benmiller. House leaked badly about the door, required new padding. Agreed to fix it properly.

M. Milgau, Bright. Fumigation all done and the box stored away for the season. Owner said that he made a test before he used it and found that it was all right.

J. McAinsh, Wellburn. Has only one box (145 cubic feet), which is made of three thicknesses of lumber and papered. It leaked slightly at the ends, which owner promised to remedy by chinking up with tar and putting on new corner pieces.

Colin McDonald, Toronto. Had ordered material with which to repair the box. Promised to have it ready the following week.

Steele Briggs Co., Toronto. Box in good shape.

J. A. Simmers, Toronto. Is not a grower of nursery stock and does not expect to have any stock to fumigate.

Grainger Bros., Toronto. Are only dealers and purchase all their stock.

Manton Bros., Toronto. Small box buried in the ground. When fumigating they place on the lid and cover entirely with earth.

R. Breckon, Toronto. Has no stock to fumigate this season.

W. M. Robinson, Kettleby. House tested and found in good order.

W. J. Mackie, Oshawa. The house was badly out of repair, and I reported its condition to the office by letter. Owner has little or no stock for sale, being almost out of the business.

N. T. Selby, Newcastle. Small amount of stock. Building poor. Is going to build a new one for next season.

W. C. Reid. Box repaired the day of inspection. It leaked considerably when tested, which he was ordered to repair.

J. W. Johnston. No stock to fumigate this season.

W. J. Conn, Kemptville. Out of business.

T. Dangerfield, Kemptville. House leaked through the cracks in the door frame. These were ordered to be repaired and re-felted.

J. P. Smith, Mountain. This was a new box, but when tested leaked a little on top. Owner promised to paper and put on another layer of boards.

Renfrew Nursery Co., Renfrew. House leaked about the door, owing to a portion of the felt having been torn off. Owners ordered to have this fixed before they used it.

Respectfully submitted,

P. W. HODGETTS,
Inspector.

Thirty-Sixth Annual Report

OF THE

Entomological Society

OF

ONTARIO

1905.

(Published by the Ontario Department of Agriculture, Toronto.)

PRINTED BY ORDER OF

THE LEGISLATIVE ASSEMBLY OF ONTARIO.

TORONTO:
Printed by L. K. CAMERON, Printer to the King's Most Excellent Majesty.
1906.

WARWICK BRO'S & RUTTER, Limited, Printers,
TORONTO.

To the Honorable WILLIAM MORTIMER CLARKE, K.C.,
Lieutenant-Governor of Ontario.

MAY IT PLEASE YOUR HONOR:

The undersigned begs to present herewith for the consideration of His Honor the Report of the Entomological Society of Ontario for 1905.

Respectfully submitted,

NELSON MONTEITH,
Minister of Agriculture.

TORONTO, 1906.

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THIRTY-SIXTH ANNUAL REPORT

OF THE

Entomological Society of Ontario

1905.

To the Honourable Nelson Monteith, Minister of Agriculture:

Sir,—I have the honour to present herewith the Thirty-sixth Annual Report of the Entomological Society of Ontario, which contains the proceedings of the Forty-second Annual Meeting of the Society. By kind invitation of President Creelman, this was held at the Ontario Agricultural College, Guelph, and was one of the most successful and interesting in the annals of the Society. The following Report contains a full account of the proceedings, the papers read and discussed and the reports of the various Officers and Branches of the Society. Two new Branches have been formed during the present year, one in British Columbia and the other at Guelph, and large additions have been made to the membership.

The *Canadian Entomologist*, the monthly magazine of the Society, has been regularly issued during the year, and has now completed its thirty-seventh volume, containing no less than 428 pages.

I have the honour to be, Sir,
Your obedient servant,
CHARLES J. S. BETHUNE,
Editor.

London, Ontario.

Entomological Society of Ontario.

OFFICERS FOR 1905-1906.

President—J. D. Evans, F.L.S., C.E., Trenton.
Vice-President—Dr. James Fletcher, Ottawa.
Secretary—W. E. Saunders, London.
Treasurer—J. A. Balkwill, London.
Directors: Division No. 1—C. H. Young, Hurdman's Bridge.
Division No. 2—C. E. Grant, Orillia.
Division No. 3—J. B. Williams, Toronto.
Division No. 4—G. E. Fisher, Burlington.
Division No. 5—Prof. Franklin Sherman, Guelph.

Directors Ex-officio—(Ex-Presidents of the Society)—Professor Wm. Saunders, C.M.G., LL.D., F.R.S.C., F.L.S., Director of the Experimental Farms of the Dominion, Ottawa; Rev. C. J. S. Bethune, M.A., D.C.L., F.R.S.C., London; James Fletcher, LL.D., F.R.S.C., F.L.S., Entomologist and Botanist of the Experimental Farms, Ottawa; W Hague Harrington, F.R.S.C., Ottawa; Professor John Dearness, Vice-Principal Normal School, London; Henry H. Lyman, M.A., F.R.G.S., F.E.S., Montreal; Rev. T. W. Fyles, D.C.L., F.L.S., Levis, P.Q.; Professor Wm. Lochhead, B.A., M.S., Ontario Agricultural College, Guelph.

Librarian and Curator—Rev. C. J. S. Bethune, London.

Auditors—W. H. Hamilton and F. A. Stuart, London.

Editor of the "Canadian Entomologist"—Rev. Dr. Bethune, London.

Editing Committee—Dr. Fletcher, Ottawa; H. H. Lyman, Montreal; J. D. Evans, Trenton; Prof. Lochhead, Guelph; G. E. Fisher, Burlington; J. B. Williams and C. W. Nash, Toronto.

Delegate to the Royal Society—A. F. Winn, Montreal.

Delegates to the Western Fair—J. A. Balkwill and W. E. Saunders.

Finance Committee—J. Dearness, J. A. Balkwill and Dr. Bethune.

Library and Rooms Committee—Messrs. Balkwill, Bethune, Bowman, Dearness and Saunders, London.

Entomological Society of Ontario.

ANNUAL MEETING.

The forty-second annual meeting of the Society was held, by kind invitation of President Creelman, at the Ontario Agricultural College, Guelph, on Wednesday and Thursday, October 18th and 19th. Owing to the unavoidable absence of Mr. John D. Evans, President of the Society, the chair was taken by the Vice-President, Dr. James Fletcher, Dominion Entomologist and Botanist, Ottawa. Among those present were: Rev. Dr. Fyles, Quebec; Mr. H. H. Lyman, Montreal; Mr. C. H. Young, Hurdman's Bridge; Mr. Arthur Gibson, Ottawa; Mr. C. C. James, Deputy Minister of Agriculture for Ontario; Messrs. J. B. Williams and C. W. Nash, Toronto; Mr. G. E. Fisher, Burlington; Rev. Dr. Bethune, London; President Creelman, Professors Lochhead, McCready, Sherman, Hutt, Reed, Messrs. Zavitz, Barlow, Jarvis, Hotson, Klugh, and others, Guelph. There were also present a large number of the young women students from the Macdonald Institute and of young men from the Agricultural College. At some of the meetings the attendance was over one hundred. The Society was also favored with the presence of Professor John B. Smith, State Entomologist of New Jersey, and a Professor in Rutger's College, one of our honorary members.

During the first morning a business meeting of the Council was held, at which the Treasurer's report was received and adopted. Application was made by a number of gentlemen belonging to the Agricultural College and the Wellington Field Naturalists' Club for the formation of a Guelph Branch of the Entomological Society of Ontario. The request was very heartily acceded to, and the Branch was inaugurated with an initial list of twenty-four members.

Professor T. D. A. Cockerell, of the University of Colorado, Boulder, Colo., an eminent entomologist, especially distinguished by his work in the Coccidæ and Hymenoptera, was unanimously elected an honorary member.

The members of the Society from a distance were very hospitably entertained at luncheon by President Creelman.

In the afternoon Dr. Fletcher took the chair at 2.30 o'clock, and called upon the Directors of the Society to read their reports on the noteworthy insects of the year in their respective divisions. The reports for the first three Divisions were read, and Mr. Fisher explained his inability to prepare a report for Division 4 owing to the pressure of business during the summer months. Prof. McCready also had no report to make for Division 5, as he had removed from London to Guelph before the opening of the season, but his place was filled by Dr. Bethune.

REPORTS ON INSECTS OF THE YEAR.

Division No. 1—Ottawa District. By C. H. Young, Hurdman's Bridge.

Like the two preceding years, the season of 1905 has not, in the Ottawa District, been marked by any serious outbreaks of injurious kinds of insects.

Early in the season the Red-backed cutworm, *Paragrotis ochrogaster*, was very bad in gardens at Meach Lake, Que., being particularly destructive to onions, peas, cucumbers, vegetable marrow, and broad beans. These caterpillars were extremely abundant in one garden which I was observing, and some evenings I killed as many as 150 and 200 specimens. Poisoned bran-mash was applied, and while this must have done some good, still the cutworms were so numerous that almost every green garden crop was eaten.

The Onion Maggot, as far as I observed, was not nearly so prevalent this year as it was in 1904. Dr. Fletcher tells me that this season he has had success with the Cook carbolic wash. In years of bad infestation nothing, however, acts as a perfect remedy.

Tent caterpillars were slightly more numerous in 1905 than they were in 1904, and it would seem as if these troublesome insects are again on the increase. Everyone can do something to lessen the numbers of these caterpillars by cutting off, whenever seen, the unsightly tents and trampling upon the contained larvæ.

An insect which has been rather abundant in some orchards in my district, is the Woolly Aphis (*Schizoneura lanigera*) of the apple. (Fig. 1.) The large snowy deposits on the limbs and trunks of trees are quite conspicuous and when seen should be destroyed. This can be done in most instances if the trees are not too large, by brushing the clusters off with a whisk, or some other such instrument, dipped in kerosene emulsion, or even pure coal oil. The Woolly Aphis on the alder has also been more than usually abundant this year around Ottawa, some trees being almost wholly covered with these insects. The Woolly Aphids on the alder are interesting on account of the larvæ of *Feniseca tarquinius* feeding upon them. This year these larvæ were quite abundant among these Woolly deposits, and I have brought some of the curious chrysalids to show here at this meeting. The larvæ of Syrphus flies were also busily engaged feeding upon the Woolly Aphids.

Young strawberry plants were destroyed in spring by White Grubs, the larvæ of the well-known June Bugs. They seemed to be very abundant the past season.

In apple orchards, in which spraying had not been practised, Codling Moth caterpillars did serious harm. In some orchards fully half the crop of apples was destroyed. In the Ottawa District, I feel sure, however, that owners of orchards are realizing more and more every year the value of spraying their trees to protect them from insect and fungous enemies.

Red currant bushes were defoliated in some gardens by the well-known Currant Saw-fly larvæ. As it does not take these larvæ very long to strip a bush of its foliage, as soon as they are noticed a remedy should at once be applied. There are two broods of this insect in the season. The remedy for the first one is to spray the bushes with a Paris green or some other arsenical solution. For the second brood, which appears later in the season when the fruit is formed, white hellebore should be dusted on to the bushes.

On some radish plants in my garden at Hurdman's Bridge this autumn, which had gone to seed, I noticed a great number of specimens of the Zebra caterpillar (*Mamestra picta*) (Fig. 2). As I was away at Meach Lake during the summer, I have not been able to find out yet whether they did any serious damage in turnip fields, etc., near by. The Birch Bucculatrix (*B. Canadensisella*) was very bad on white birch trees at Meach Lake, the leaves having a scarred appearance, and falling prematurely from the trees. The insect did not occur on birches nearer to Ottawa.

Fall Webworm was also noticeably abundant in September on forest trees and in orchards. This insect is such an easy one to destroy in orchards that it is a wonder to me owners do not cut off the colonies of caterpillars when first noticed.

The foliage of many maple trees around Ottawa was this year badly attacked by the Maple-leaf Gall mite, *Phytoptus quadripes*, on numerous fine trees, the leaves being conspicuously distorted by the galls made by this tiny mite.

I have brought to the meeting a collection of Micro-Lepidoptera which I have made at Ottawa and Meach Lake during the past two seasons. This year I have mounted up nearly 1,500 of these small moths. I have also brought some interesting larger moths, which are rare in the Ottawa District.

DIVISION NO. 2—MIDLAND DISTRICT. BY C. E. GRANT.

This has been a fine year for the entomologist, many species appearing in numbers surpassing anything seen since 1898, and whilst that was the case with some species, very little injury has been noticed or reported to me from injurious insects. Of course the Codling moth (*Carpocapsa pomonella*), the Potato-beetle (*Doryphora decemlineata*) are always with us, and Onion Maggots (*Phorbia ceparum*) and the Cutworms of various kinds were also plentiful *Mamestra arctica* in particular. I again note the scarcity of the imported Currant-worm (*Nematus ribesii*), the Tent-caterpillars (*Clisiocampa Americana* and *disstria*) and also the Tomato Hawk-moth (*Proptoparce celeus*). The Cottony Maple Scale was noted on the maple trees, but not in unusual quantities; Asparagus-beetles have not reached us yet. No complaints were received of the Pea-weevil. The Tussock moths were abundant this fall, *Antiqua* being by far the most plentiful.

I have added a lot of new moths to my collection not yet identified. The following I recognized, namely, *Macronoctua onusta, Panchrysia purpurigera, Hadena ducta, Perigea vecors, Remigia repanda, Prothymia rhodarialis, Marasmalus inficita, Noctua jucunda, Ancyloxypha numitor*, and a new Plusia, making twenty-one species of this genus taken in Orillia.

Butterflies were very numerous, *Grapta J. album, Vanessa antiopa, Pyrameis cardui* and *huntera*, and *Atlantis* very much more so than ever before noticed. The Geometrids were also very much in evidence; among several new ones mention might be made of *Phasiane Orilliata, Macaria glomeraria, Plagodis alcolaria*, and *Philereme Californiata*.

On October 14th I took *Remigia repanda, Aletia argillacea, Xylina antennata, Orthosia ferruginoides*, and *Scopelosoma tristigmata*.

DIVISION NO. 3—TORONTO DISTRICT. BY J. B. WILLIAMS, TORONTO.

I was not well enough during the past summer to do much entomological work, so that my observations on insect pests have been confined mainly to the ravages of the Grey Tussock moth (*Hemerocampa leucostigma*) on the shade trees in the streets of Toronto. (Figs. 3 and 4.) They were very numerous this year, especially on the horse-chestnuts.

The city authorities spent some money in the collection of the egg masses during the past winter, but there are so many infested trees in private grounds that the destruction of eggs on shade trees only cannot effectually check them. There are eight chestnut trees on the grounds in front of the house where I live, some of which were partially denuded of their foliage by these caterpillars. Towards the middle of July, while sitting under these trees, one could hear a continual patter on the grass as the creatures dropped themselves down from the branches; and quite an army of them were creeping about the ground for several days, while they sought for places to pupate. Females emerged and began to lay eggs about the 5th of August.

I offered a small sum to several boys on the street if they would clear the cocoons off those eight trees. Some of them were good climbers, and they collected, I believe, about two buckets full. The trees are now, apparently, free from them, and it will be interesting to observe next season to what extent this clearing has been effectual, for there are no other chestnut trees near them.

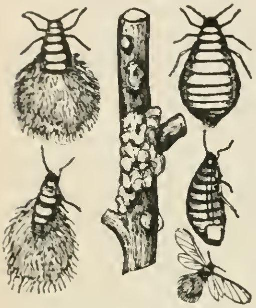

Fig. 1. Woolly aphis of the apple; much enlarged, except twig.

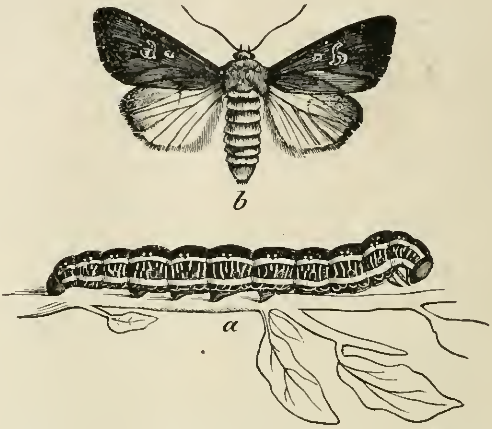

Fig. 2. *a* Zebra caterpillar, *b* the moth, Mamestra picta.

Walking-stick insects (*Diapheromera femorata*), which were so numerous in some localities last year, have only appeared this year in about their ordinary numbers.

Tent caterpillars, as far as I have noticed, have been comparatively scarce around Toronto, and Dr. Brodie's observations also confirm this statement.

I heard one complaint of apples, from a garden north of the city, having worms in them, but I had no opportunity to examine any of them.

Division No. 5—London District. By C. J. S. Bethune.

At the request of Professor McCready, whose appointment to the chair of Nature Study at the Macdonald Institute, Guelph, caused his removal from London last winter, I beg to make a report upon the noteworthy insects of the past season in that part of the country.

In the city of London itself public attention has been especially drawn to the widespread abundance of the Cottony Maple Scale (*Pulvinaria innumerabilis*, Rathv.) on the shade trees of the streets and boulevards of the city. (Fig. 5.) On the maple and basswood trees especially it was to be found in countless millions, and the cottony tufts of egg-masses on the underside of twigs and branches were so numerous and so close together as to look as if the boughs had been thickly spattered with whitewash. Towards the end of August the leaves on many trees were curled and withered from the continuous drain of the scale insects and began to fall prematurely; in some instances the trees were almost bare by the first of September. Grape vines, the Boston ivy, Virginia creeper, and many shrubs were included in the attack, and injury was also caused to plants and flowers by the constant drip of "honey dew" and the black fungus that grew wherever it fell. This attack has been going on for some years and steadily increasing in extent, and now it seems to have reached its culmination, and, we may hope, may begin to decline. Two years ago at our annual meeting, I gave an account of this insect and an outline of its life history; as this was published in our Report for 1903, it is unnecessary to go over the same ground again. In September last the Park Superintendent and one of the aldermen asked the local members of the Society to report upon this insect and the Tussock moth to the City Council. This was accordingly done, and on the 2nd of October we attended at the City Hall and were invited by the Mayor to present any report we had to make.

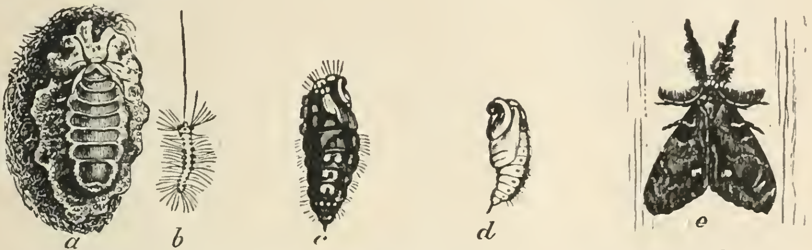

Fig. 3. Tussock moth : *a* wingless female moth on its cocoon ; *b* young caterpillar ; *c* chrysalis of female ; *d* of male ; *e* male moth.

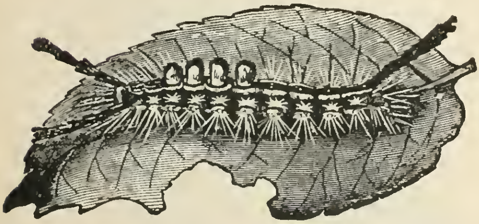

Fig. 4. Tussock moth : full-grown caterpillar.

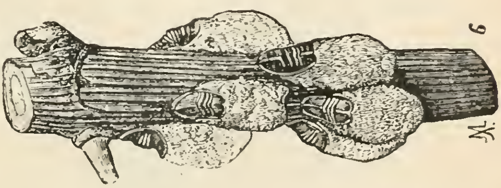

Fig. 5. Cottony maple scale ; female scales with tufts containing eggs.

The Tussock moth (Figs. 3 and 4) was the subject of newspaper articles in the local press from time to time during the summer, and fears were expressed that, as it was very destructive in Toronto and doing some injury in Hamilton, it might soon reach London. We were able to assure the City Council that this dreaded insect had been well known in London to entomologists for thirty or forty years, and that during the past summer it had been as plentiful as usual. It was not, however, numerous enough to be a cause of any alarm, and no injury to the trees of the city could be charged to it. A simple method of preventing its increase was suggested and will no doubt be carried out, namely, the gathering and destroying during the winter the masses of eggs laid by the wingless female moth on her cocoon. These are white and conspicuous and in most cases within easy reach; they are so few in number that any householder could clear the trees on his own premises in a few minutes, and the work of removing them from the city trees would involve but little labor. It was recommended that only the cocoons bearing egg-masses should be destroyed, as the others contained either empty male chrysalids or parasites.

With regard to the Cottony Maple Scale, we were unable to suggest any practicable remedy. Two methods of dealing with the insect were mentioned as worthy of adoption by anyone who wished to protect his own trees: first, the spraying of the trees during the winter with the lime and sulphur wash that is found so effective in the case of the San Jose Scale, in order to destroy the female scales that winter on the twigs and branches of the trees; and secondly, by spraying of the trees with kerosene emulsion towards the end of June and during the first two weeks of July—three or four times in all—in order to destroy the lice when they are hatched from the egg-masses and are moving about in search of a final resting place. At this particular time they are exposed and can be reached by spraying, but as soon as they attach themselves to the leaves and become covered with their scale they are practically invulnerable. The Park Superintendent was instructed to try these methods on selected trees and report results next year, but it was felt to be beyond the power of the city authorities to deal with the immense number of shade trees throughout the city, unless they were quite sure of exterminating the pest.

By way of encouragement I mentioned to the Council that this insect is well known in many cities in the United States, and the general experience has been that after a few years of abundance it ceases to be numerous for a time owing to the attacks of parasitic insects and the effects of atmospheric conditions. It does not, as a rule, kill the trees, because its attacks do not strip off the foliage nor entirely prevent the leaves from discharging their function, though when so numerous as at present they must certainly impair the vigor, if not the vitality, of the trees they infest. As an illustration of their numbers, I may mention that on a single maple leaf picked at random from a tree I counted 707 scales on the under side and 72 on the upper surface. When we consider the number of leaves on a large tree, the majority of which are infested, the specific name *innumerabilis* seems most appropriate.

There were several other insect attacks during the year that may be mentioned, but they did not attract public attention.

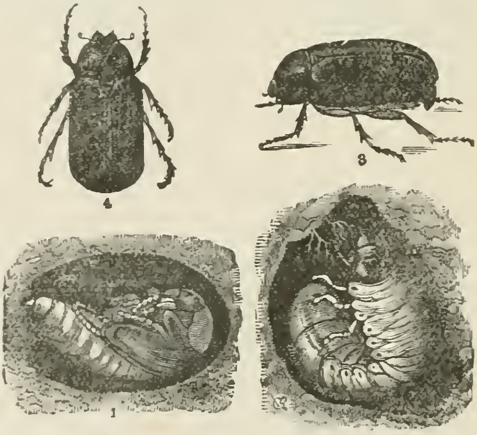

Fig. 6. May beetle: 1 pupa, 2 the white grub, 3 and 4 the beetles.

White grubs (larvæ of *Lachnosterna* or May Beetles) (Fig. 6), were complained of in some cases both in Woodstock and London on account of the damage they had done to lawns by devouring the roots of the grass. As they work underground and spend three years in the larval state, it is not easy to prescribe a remedy. In the case of old pasture fields, where they sometimes become very abundant, a simple remedy would be to plough up the sod and turn in pigs or turkeys, and then to grow a root crop. Where lawns are badly damaged it would be worth while to dig up the affected parts late in the autumn and expose the grubs to the frost, or during the summer to remove the sod and soak the ground below with coal oil. Subsequently new earth could be filled in and fresh turf laid.

Wire-worms (larvæ of *Elateridæ* or Click-beetles) were very abundant in many market gardens in the neighborhood of London. As these creatures also work under ground it is difficult to find a remedy that will be effective. Much, however, may be done to reduce their numbers by trapping them. This is done by placing bunches of clover or sweetened meal poisoned with Paris green under shingles or pieces of board where they are troublesome. The insects are in the habit of taking refuge in the daytime beneath shelters of this kind and will naturally partake of the poisoned food they find provided for them.

The 12-spotted Asparagus beetle (*Crioceris 12-punctata*) is becoming each year more and more numerous in gardens about London. The other species, *C. asparagi*, has not yet made its appearance. Dusting with air-slaked lime seems to be the simplest and most effective remedy for getting rid of the larvæ which feed upon the foliage during the summer.

The Fall Web-worm (*Hyphantria textor*) has been somewhat in evidence with its unsightly webs on some trees here and there on the city streets, and on many shrubs and trees in Springbank Park. As soon as the Superintendent's attention was drawn to them, they were speedily got rid of in the Park, but on private grounds many were left unmolested. It is such an easy matter to remove the webs with a stick, and destroy the inmates by trampling under foot, that there is no excuse for neglecting them. It is true that they generally inflict but little damage upon the trees owing to the lateness of their attack, but they are very unsightly and are sometimes very injurious to young trees and shrubs.

The Codling Moth is reported to have been more prevalent than usual this year and to have considerably affected the apple crop about London. The increase of this serious pest is no doubt due to the neglect of spraying, and possibly to ignorance of the fact that there are two broods in the year in this region of country.

The Pea-weevil, on the other hand, is very little complained of, and could be effectually checked if a combined effort were made by all growers and seedsmen. Fumigation with bisulphide of carbon is an easy remedy and not expensive. Its general adoption would soon restore the growing of peas to the valuable position it formerly held in Ontario.

Regarding the Hessian fly, no complaints at all were heard and evidently no appreciable damage was done.

Cutworms, Squash-bugs, Onion and other root maggots were as prevalent as usual and gave the market gardeners much trouble. On the whole the season was not marked by any unusual or violent outbreak of insects, with the exception of the Cottony Maple Scale already referred to.

DISCUSSION OF THE DIRECTORS' REPORTS.

The Tussock moth was the first insect taken up for consideration.

Mr. T. D. JARVIS stated that at St. Catharines and in Toronto eighty per cent. of the cocoons that he examined were parasitized by Pimplas and Chalcid flies.

Prof. J. B. SMITH explained that one of these classes of insects was a secondary parasite upon the other, and could not, therefore, be credited with aiding in the reduction of the Tussock moths, but rather the contrary.

Mr. C. W. NASH said that the Tussock moth was by no means confined to cities, as he had found them abundant all through the County of York and even as far away as St. Joseph's Island in Lake Huron. There he had found a female depositing its eggs as late as the 8th of October. His experience was very different from that of Mr. Jarvis, for he had only found one cocoon in 400 parasitized; many, however, were diseased and their contents had become fluid.

Prof. J. B. Smith had collected many egg-masses and found none that were parasitized. In the southern part of the State of New Jersey there were two broods of the insect in the year, but in the northern part only one. The city of Newark is situated on the dividing line between the life-zones, and consequently there are two broods in part of the city and only one in the rest. Ten cents per quart was paid for egg-masses collected, but he considered spraying with Paris green a much cheaper method of destruction, as it only cost about ten cents per tree, while egg-collecting came to $2.50 when the attack was severe. The egg-masses he found to contain an average of 200 eggs.

Dr. Fletcher, in reply to a question as to whether spraying should be discontinued in order to avoid killing the parasites as well as the noxious insects, stated that it was much safer to spray and be sure of killing the enemy, especially as there was no certainty regarding the work of the parasites. In answer to a further question, Does spraying kill internal parasites? he replied, Yes, if it destroys the insect which supplies its parasite with food. On one occasion he had found a number of parasites in egg-masses on trees at the corner of King and Simcoe streets, Toronto.

In remarking upon Dr. Bethune's paper, he stated that the Codling Moth was one-brooded from Toronto eastward and two-brooded westward. At Ottawa, where there is but one brood, spraying in the spring is sufficient for its control, but at London the conditions are quite different. For the Cottony Maple Scale he recommended treatment of the trees in winter with the lime and sulphur wash. White-grubs in lawns may be checked by freely spraying the affected portions with kerosene emulsion and then washing with water. Click-beetles, the parents of Wire-worms, are attracted in large numbers to the bait used at night in sugaring for moths, and might be largely destroyed by this means. It was remarkable that the twelve-spotted Asparagus beetle should have outstripped the other species in its advance westward through Ontario; the latter (*C. Asparagi*) was spreading very slowly. The Pea-weevil is at present somewhat scarce and therefore now is the time for a successful fight against it. The growers of peas should not pay five times too much for their seed, because peas infested with weevils only contain one-fifth of their proper contents. The seedsmen are now fumigating their peas, because their customers demand seeds that have been treated with bi-sulphide of carbon,—the method is very simple and should be universally adopted.

Mr. C. W. Nash said that peas should be treated at once after they are harvested, because a large proportion of the weevils emerge from the peas early in October and thus escape fumigation, if it is postponed to a later date. They may be found in immense numbers in barns where peas have been stored.

Prof. J. B. Smith asked whether the White-grubs referred to by Dr. Bethune were hairy or smooth. On being told that they were smooth and the larvæ of May-beetles (*Lachnosterna*), he said that at Washington a few years ago a lawn was so badly affected by White-grubs, which ate the roots of the grass, that the turf could be rolled up like a carpet; there the grubs were hairy and the larvæ of *Allorhina nitida* (a beetle which does not occur in Ontario).

In New Jersey they had had a similar experience to that in London with the Cottony Maple Scale,—the city of Plainfield last year was the worst affected and the numbers were similar to those described by Dr. Bethune. The large wintering scales of the female he had found abundantly parasitized. A Lady-bird beetle (*Hyperaspis*) was very numerous and attacked the scales, while its larvæ devoured the eggs in the cottony masses. The parasites became more and more abundant as the season went on, and he had every confidence that there would be little or no trouble from this insect at Plainfield next year. His count of scales was similar, having found from 500 to 800 on a single leaf. Insecticides of various kinds had been tried, but he could find nothing that would kill the insects and not injure the foliage. He had, therefore, resorted to water from the city mains, and found that with a hose the eggs could be washed off the trees if applied when the cottony masses are opening early in May. This is a simple, easy and inexpensive remedy, and one that is ready at hand for every one who has a lawn and hose for watering it. If the scales are higher up than their usual position on the lower branches they can usually be reached with the assistance of a step-ladder.

Mr. C. W. **Nash** spoke of the damage done to asters and dahlias by the Tarnished Plant-bug (*Lygus pratensis*) and the trouble it gave to florists in Toronto; dusting with Pyrethrum insect powder was recommended as a remedy. He also referred to the prevalence of Hydrœcias (*Gortyna*) this year; he had found them boring into the roots and stalks of rhubarb, dahlias, Rudbeckia, burdock and in fact all plants that were capable of holding them; two species, *Gortyna nitela* and *cataphracta*, were especially abundant.

Dr. **Fletcher** drew attention to the good work being done by Mr. H. H. Lyman and other entomologists in Montreal in breeding and tracing out the life-histories of these moths. *G. nitela* was of use, as it destroys large numbers of Canada thistles and rag-weed.

THE "TUSSOCKS."

By The Rev. Thomas W. Fyles, D.C.L., F.L.S.

The common application "Tussock Moths," as applied to the perfect insects of the species *Orgyia antiqua*, Linneus, and *Orgyia leucostigma*, Smith and Abbot, (Fig. 7), is a misnomer. It is to the *caterpillars* of these species that the name "Tussock" is properly applied—they are conspicuously *tussocky*, or tufted, along the back, (Fig. 4). The generic name Notolophus given to these insects by Germar signifies this:—*Notos*—the back; *Lophos*—a crest. The male perfect insects of the two kinds have been very appropriately called "Vapourers," because of their airy and uncertain flight. They are known respectively as the "Brown Vapourer" and the "Grey Vapourer." The females of both species are incapable of flight, having only rudimentary wings.

The Greek generic name *Orgyia* was probably given because of the outstretched black pencils extending like arms from the shoulders of the larva. The feminine specific name, *antiqua*, from the Latin, appropriately denotes the grey and hunched form of the female moth. Linneus was often fanciful in his application of names!

The term *leucostigma* was given by Smith and Abbot to the Grey Vapourer on account of its white spots, (Fig. 3*e*); though the spots on Antiqua are more conspicuous than they, because of their darker setting.

The genus Orgyia belongs to the family *Liparidæ* which, in England, includes some very handsome, and also some very troublesome species. *Psilura monacha*, the "Black Arches," is a remarkably beautiful moth. *Porthetria dispar*, the "Gypsy Moth," is handsome, but its larvæ are destructive; whilst the larvæ of *Europroctis chrysorrhœa*, the "Brown-Moth" are offensive, not only from their destructiveness, but also from the fact that their barbed hairs are easily cast, and, alighting on the human skin, work their way into its pores, and cause excessive irritation. In my early efforts at raising insects, in England, I again and again experienced the baneful effects of too close contact with these caterpillars.

The story of the introduction of the Brown-tail and Gypsy Moths to Massachusetts has been well told in the publications of Messrs. Fernald and Kirkland and Forbush; and so the evil reputation of these species has been widely spread. People in Canada have looked for their advent with apprehension. It is not to be wondered at, therefore, that when the egg-masses of an allied, but less injurious, species became conspicuous, *to expectant eyes*, something like a panic occurred—it was thought that the dreadful *Gypsy Moth* was come.

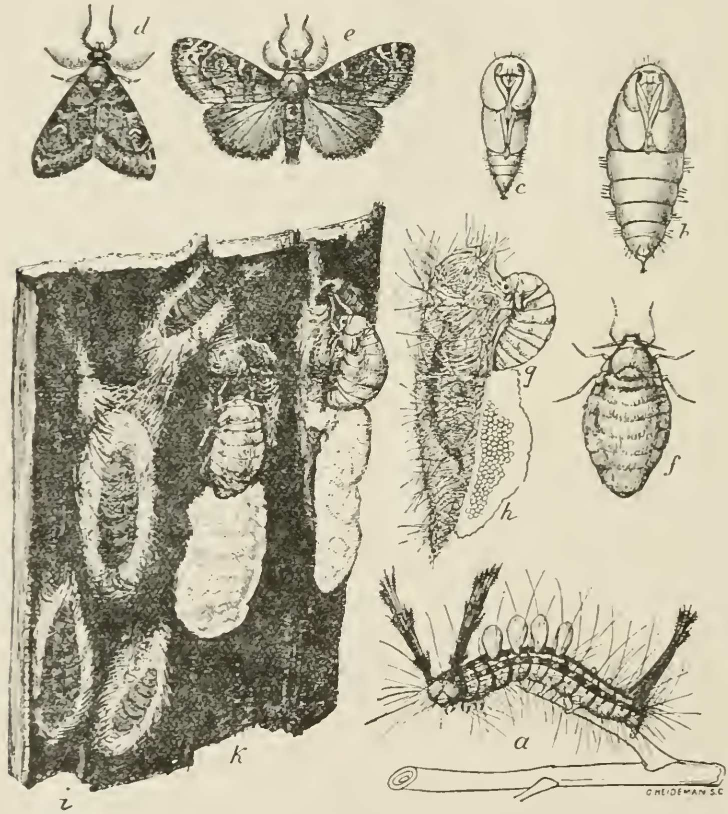

Fig. 7. Tussock moth : *a* caterpillar ; *b* and *c* chrysalids ; *d* and *e* male moths ; *f* and *g* female moths ; *h* eggs ; *i* male cocoons ; *k* female moths and egg-masses on cocoons.

I have known both the Brown Vapourer and the Grey for many years. The former, indeed, attracted my attention soon after my arrival in Canada; for it was to me an old acquaintance. Both species are common at Quebec. *Leucostigma* has been plentiful here for some years past—it has never done noteworthy damage. Its favourite food here is the White Willow (*Salix alba*, Linneus); and patches of its eggs may at this present time (October, 1905), be seen on the bolls of the willows in the Custom House Square, and along Mountain Hill.

I have always regarded the larvæ of *Antiqua* and *Leucostigma* as harmless and very beautiful objects—creatures to be admired. I certainly read with amused surprise the following paragraph in the "Montreal Daily Star" of July 22nd last:—

"It is now beyond question that in addition to the caterpillars being very destructive to vegetation, they are also poisonous to human beings. They can let themselves down from a tree by means of a silken thread, similar to that made by the spider. They seem especially to like to get down the back of one's neck, and they certainly do some painful work there."

What a thick skin a man must have who could let a caterpillar alight on his neck, and not brush it off immediately!

Still further to alarm the public, and to show "that our troubles have hardly commenced yet," the writer in the "Star" proceeds to describe the ravages of the *Gypsy Moth* in Massachusetts, and re-produces some of the illustrations from Forbush and Fernald's Report. There is a representation of the Dexter Elm with ten men engaged in freeing it from the eggs of the moth.

There, too, is a picture of the destroying of the eggs in a stone wall by means of cyclone burner.

Both of these are likely to excite apprehension, but are hardly fair to the Tussocks, who were not the guilty parties in the case. "Give a dog a bad name and hang him!"

We remember the "Kissing Bug Scare," in which kissing-bugs multiplied to such an extent that it was hard to believe that any damsel could go unkissed.

In this Tussock Moth Scare, whatever damage has been done to trees, the Tussocks—in popular opinion—have been the doers of it. One man told that the gooseberry bushes in the gardens near him had been defoliated—of course the Tussocks had done the harm, and not *Eufitchia ribearia*, nor *Nematus ventricosus.* The larvæ of *Vanessa Antiopa, Clisiocampa disstria, Hibernia tiliaria, Hyphantria textor,* and others, always do their share towards denuding the trees; but for injuries done by these the Tussocks are now held blame-worthy.

To show how easily a mistake might arise:—A person at Quebec, on the look-out for damage by the Tussocks, would notice that the Ash-trees, which formerly were such graceful adornments to the public squares and gardens of the city, were leafless, dead, or dying. "Oh," he would be likely to exclaim, "the terrible Tussock Moths!" But the Tussocks were entirely blameless in this case. My attention was directed to the trees, in the spring of 1904, by Mr. Joly de Lotbinière. I examined them carefully, and could find no trace of injurious insects. I came to the conclusion that the death of so many of these beautiful trees was occasioned by the excessive drought of the preceding spring.

I had recorded that on the 11th of April, 1903, and again on the 12th, the thermometer in my yard indicated 82 degrees in the shade. The untimely heat was followed by a long, cold, and exceedingly dry time. Prayers for rain were offered in some of our churches.

In the end of May and beginning of June, the air was thick with smoke from forest fires. On the 3rd of June the smoke was so dense that the river steamboat "Frontenac" was unable to run.

I am convinced that the young foliage of the ash trees was so affected by these circumstances that it performed its functions imperfectly. Then, too, the earth was so parched that the roots of the trees must have failed to extract nutriment from it—the Ash is a tree that requires much moisture! The unfavourable summer was followed by a very severe winter.

To these consecutive circumstances I ascribe the loss of so many of our Ash trees, and not to insect depredations.*

The two Canadian species of Orgyia may be easily distinguished in every stage of their existence.

The eggs of *Antiqua* resemble a cluster of whitey-brown beads; those of *Leucostigma* to a dab of cake-frosting.

The larva of *Antiqua* has a *black* head; that of *Leucostigma* has a *red* one.

The difference in the moths has already been sufficiently shown.

It is impossible that the Tussocks can ever be as destructive as the Gypsy Moth has proved itself. Their females have no wings—they lay their eggs on the cocoons from which they crept. So the advance of the species is slow, and is made by the caterpillars. But the female Gypsy Moth has ample wings; and, though it is heavy with its burden of eggs, it can, and does, take flight for other localities. Its caterpillar, moreover, attains a much greater size, and is more voracious than either of our Tussock larvæ.

The close of the autumn is undoubtedly the season for reducing the numbers of *Orgyia antiqua* and *Orgyia leucostigma*. The egg-clusters of both species may be easily peeled from the trees with the thumb and finger. They should then be thrown into the fire. So the numbers of the creatures can be kept down with ease and without cruelty.

THE TUSSOCK MOTH SITUATION IN MONTREAL.

By Henry H. Lyman, M.A., Montreal, Que.

Until Montreal was visited early last spring by a gentleman from Lincoln Park, Chicago, we hardly knew that we had a Tussock Moth situation in our city. Those of us who know about such things, of course, knew that we had the Tussock Moth, that, like the poor, it was always with us and always likely to be with us. But this gentleman, seeing a good many egg masses on trees, sounded the alarm, and addressed a letter of warning to the President of the Natural History Society, who happened to be a Professor of Botany.

The newspapers took the matter up, and one especially devoted much space and energy to a sensational account of the "arrival" of this much dreaded pest, and, evidently confusing it with the Gypsy Moth, told of the millions which had been spent in the United States in fighting it.

A meeting of the Natural History Society was called to consider the situation, to which the public were invited, and about twenty, all told, responded—the Dominion Entomologist being present to throw light on the subject.

After considerable discussion, a Tussock Moth Committee was appointed which later waited upon the Finance Committee and asked for a grant to be used in fighting the pest. The Committee voted the munificent sum of $100 for this purpose. The Society then offered a bounty of 25c. per hundred for the egg masses (Fig. 7*k*), and the school children began to collect them, and much good was anticipated, as the amount voted would have paid bounties on 40,000 egg masses, but the Parks and Ferries Committee of the city council took alarm. Here were no less than one hundred good dollars slipping through their fingers to a purely disinterested society, and being honestly expended for the good of the city without the slightest chance of patronage on their part—which was, of course, intolerable. So they demanded the money, and took over the campaign themselves, withdrawing the bounty, and, instead, putting men to work with poles with tin triangles on the ends to scrape the cocoons off the trees and let them lie where they fell.

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*The trees were cut down this fall (1905). The wood was found to be perfectly sound—quite free from borers.

A certain amount of scraping was, of course, done, but I doubt if we got more than $50.00 worth for the $100.00 expended. The work was begun late, and done much too leisurely, and had it not been that the eggs were unusually late in hatching, would have been even less effective than it was.

In spite, however, of the inefficiency of the work, no very serious damage resulted. A few isolated trees were stripped of their leaves, and a good many trees had at least a part of their foliage rendered pretty ragged, but a very large number of trees were hardly affected at all.

In the grounds about the house where I live there are many trees—silver maples, elms, horse chestnut, butternut, black cherry—and a careful search early in the season only resulted in my finding two egg masses and one female cocoon from which the imago had never emerged. This was removed from the tree and placed in a glass-bottomed pill box, and later there emerged from it over a hundred parasites which, on being submitted to Dr. Ashmead, were pronounced *Diglochis omnivora*, Walker, which I was informed was not previously known to be a parasite of *Orgyia Leucostigma*.

Before the time for the eggs to hatch, I selected a few cocoons with typical egg masses, and immersed them for about ten minutes in gasoline, which I thought would kill the eggs, intending later to place one of them with an inflated larva with the moths in my collection. Fortunately, I did not do so at the time, as I found later that many of the larvæ had hatched, though perhaps some of the eggs were killed by the gasoline bath.

As the caterpillars of the Tussock moth matured and the damage to the trees became quite evident, the city fathers took alarm for fear there might be a second brood which would be much more destructive than the first, but they were assured by the official entomologist that there was no danger of that. There must, nevertheless, have been a few eggs which hatched, as Mr. Winn reported seeing a few days ago nearly mature larvæ crawling around, and a newly emerged female ovipositing. The numbers were, however, too insignificant to cause any further appreciable damage.

A Bank manager, knowing the nature of my business, applied to me for a "prescription" to clear out the pest from his trees, but when I told him that it was never possible to exterminate an insect pest, that all we could do was to control it, and recommended careful, hard and continuous work in removing the egg masses from his trees, I am afraid that he thought that there was not much good in entomology.

The Parks and Ferries Committee decided to apply to the Finance Committee for a grant of $500.00 for further work in removing the egg masses this autumn, but I have learned from the Secretary of the former committee that only $200.00 was granted, and that this wholly insufficient grant has been nearly all expended.

In this matter, however, I think we are likely to derive nearly as much benefit from the action of natural causes as from the efforts of man. Probably owing to the frequent rains, bacterial disease broke out among the caterpillars when approaching maturity, and many were seen hanging limp and rotten from this cause.

Of a number of cocoons which I gathered for Dr. Fletcher many were found to be putrid, and I have seen many cocoons, apparently of females, from which the moths had evidently not emerged.

In view of the preparation of this paper I devoted a few hours recently to a necessarily rapid and very cursory examination of the shade trees in some of the principal uptown streets and squares, as well as making inquiries among my entomological friends. I ascertained that on one street a horse-chestnut in a garden had been quite stripped, but that it had leafed out again and had even blossomed a second time. I examined it, and found that it was an old and decrepit tree. In the same garden there is a specimen of what used to be called *Negundo Aceroides*, but now *Acer Negundo*, L. (the Ash-leaved Maple), which had also been stripped, but a few yards further up on the opposite side of the street were Horse-chestnuts and Ash-leaved maples which had practically not suffered at all.

We have very few Horse-chestnuts in Montreal, and practically none on the streets, nearly all the trees set out in the streets being maples and elms. But Acer Negundo, where attacked, seemed to suffer more than any other tree. The examination I made disclosed only a few trees very seriously infested, but very many trees were found which had a few egg masses upon them.

A few egg masses were found on telegraph poles, and, as I suggested to Dr. Fletcher, if the caterpillars could be induced to eat them they would be the greatest possible blessing to our city.

It is greatly to be deplored that the Finance Committee voted so inadequate an amount, as had the full $500.00 been granted a great deal more work could have been done, and as the species has only been increasing slowly of recent years, if all the egg masses which could be found were destroyed, it would probably be years before any further expense would have to be incurred; but doing the work in only a half-hearted way will necessitate its being done every year if our shade trees are to be protected from damage.

No depredations by this pest were perceptible in the district surrounding Montreal, and the damage to the shade trees in the city is, doubtless, to be attributed to the greater immunity of the caterpillars from their natural bird and insect enemies.

ENTOMOLOGICAL CONDITIONS IN NORTH CAROLINA.

By Franklin Sherman, Jr., Professor of Entomology and Zoology, O.A.C., Guelph.

North Carolina is a State of approximately the same area as "Old Ontario," approximately the same length, and approximately the same population, and lies directly south of Old Ontario, Ottawa being almost precisely north of Cape Hatteras, and Windsor north of Murphy, the western-most county seat. At its eastern end the State is some 150 miles broad, across the middle something like 100 miles, and tapers to a dull point at the south-western extremity. In fact, the State is somewhat slipper-shaped.

The population is more evenly distributed than in Old Ontario, there being no large region so thinly settled as the northern section of our province, and no large region so thickly settled as the southern section. There are no large cities, Wilmington, the largest, having but 25,000 population, and Raleigh, the capital, having 13,000, almost exactly the size of Guelph. From these facts it is easy to conclude (and rightly) that agriculture is the chief occupation in all parts of the state, far out-ranking all other industries combined in the amount invested and in returns. The abolition of slavery forty years ago left these people poor, and many of the large plantations were abandoned, while, as a rule, the farms are still too large to be cultivated to best advantage. An abundance of cheap, inefficient and generally ignorant labor, and a scarcity of intelligent and reliable help, has had a very detrimental effect. In all parts of the state, especially east of the mountains, may be seen abandoned farm lands, and occupied lands which are poorly cared for. These facts all influence the entomological conditions prevailing.

Geologically, the state is very distinctly divided into three great regions:—*1st*, the Eastern, or coastal plain region, extending from the coast to about 100 miles inland to an elevation of 300 feet. *2nd*, the Middle, or piedmont region, extending from the coastal plains region to the foot of the mountains, a belt some 150 miles in width, ranging from 300 to 1,000 feet elevation. *3rd*, the Western, or mountain region extending from the Blue Ridge mountains to the Great Smokies which form the western boundary of the state. Elevation ranges from 1,000 to 6,700 feet. The Blue Ridge is the water-shed, and the fauna and flora of the mountain region partakes to some degree of the nature of the Mississippi valley, though the Great Smoky Range cuts off many of the typical and more southern forms. I shall only mention such insects as are of interest as showing distribution, variation in habits, remedies, etc.

The Eastern Region.

This portion lies principally in what is biologically known as the humid area of the Lower Austral Zone, a zone not at all represented in Ontario. The soil is for the most part sandy, or a black muck or peat. The crops are corn, cotton, peanuts, sorghum, a little rice along the coast, potatoes (both Irish and Sweet), and garden truck for early shipment to northern markets.

Insects of Staple Crops. The Black Grain weevil, *Calandra oryzae*, occurs abundantly throughout this region. Carbon bi-sulphide is the remedy recommended, and is satisfactory when properly applied. The Corn Bill beetle, *Sphenophorus sculptilis*, is destructive to young corn on low lands, especially those subject to overflow. They are worse on lands just from rice sod, and the avoidance of such lands is the only satisfactory method of averting injury. During the last two seasons there have been serious outbreaks of the Sugar-cane Beetle, *Ligyrus rugiceps*, although this is typically a pest of the cane plantations along the Gulf of Mexico. A satisfactory remedy for this insect is yet to be devised. Late planting was the only expedient which proved worthy of notice. The Corn Stalk-borer, *Diatraea saccharalis*, (Lepidoptera) is also destructive throughout this area, while the Ear-worm, *Heliothis armigera*, (Lep.) I have seen destroy whole fields of sweet corn, every ear containing from one to twelve of the voracious larvæ. This latter insect is also frequently guilty of boring into the bolls of cotton, and of recent years, since there has been so much discussion of the Boll-weevil, farmers often mistake it for this pest. The peanut has no serious insect pest to my knowledge.

Insects of Garden Crops. Throughout most of this region the Potato-beetle, *Doryphora 10-lineata*, is abundant and destructive, though, curiously enough, I had a report from one isolated locality that it appeared there in numbers for the first time in 1901. It can hardly be said that spraying is a common practice even in combatting this pest, as labor is generally so ignorant throughout this region that pumps would be rapidly broken, and the work would be poorly done. Hand-picking is, therefore, much relied upon even at this late day. Paris green mixed with lime or land plaster is also widely used as a dust application. It is only within the last year that I heard of three field sprayers, spraing four rows at a time, being purchased in this section, although the growing of Irish potatoes is a leading industry in many localities. Some few of the growers have knapsack pumps, but the universal complaint is that hands are not to be had who will honestly and carefully do a day's work with them.

The Harlequin Cabbage Bug, *Murgantia histrionica,* (Fig. 8), while common enough in all the state east of the mountains, is much more abundant here than further west. It is one of the Stink-bug family (Pentatomidae), and is a destructive enemy of cruciferous crops, especially cabbage and collards in this region. Hand-picking and late planting are the principal remedies.

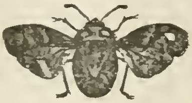

Fig. 8. Harlequin cabbage bug.

In the strawberry section the Strawberry Weevil, *Anthonomus signatus,* is the most important enemy. So far as I have been able to learn this is the southern-most region for this pest on the Atlantic seaboard, but surely it is very destructive here. It lays its egg within the bud and then cuts the pedicel. The staminate varieties are chiefly attacked, and by the use of a large proportion of pistillate varieties the growers are able to secure the greatest degree of immunity. The insect also breeds in abundance on the blackberries (*Rubus sp.*), which grow wild in that region, and the use of fire to burn out these vines as well as to run over the berry fields as soon as picking is over, is coming into favor, as many of the developing larvæ, pupae, and fresh adults are still in the fields after the last of the crop is removed.

Insects of Orchard Fruits. The *Codling Moth* is abundant and destructive in this section, good crops of apples being a thing almost unknown in recent years. Within the last few years, however, spraying is becoming more popular in the orchards, especially as these are generally small and the owners in many cases do their work with their own hands. The *Plum Curculio* throughout this region is as destructive to the peach as to the plum. The jarring method is being widely used in commercial orchards, as it is a purely mechanical process which can be done by even the most ignorant laborers, for even they can soon be taught to recognize the adult beetle. The largest peach and plum section is in the western part of the Eastern Region, at Southern Pines. Here the *San Jose Scale* has been well known for the last ten years, yet I know of many thousands of trees which have been known to be more or less infested for eight years, and which this year brought forth the sixth consecutive profitable crop, a tribute to the efficacy of careful, persistent spraying. In these orchards oils and soaps were relied upon until about three years ago, since which time the Lime-Sulphur-Salt wash has held sway. One large orchard has been treated principally by the fumigation method, and is in excellent condition, and the owners are now undecided whether it will be better to renew their outfit of tents or resort to the wash. I think that the tendency is, and will continue to be, to avoid the use of self-cooked mixtures or chemical substitutes, and use only the wash made of lime, sulphur *and salt*, boiled with artificial heat for not less than one hour. In this particular region white labor is quite obtainable, hence conditions are more favorable for the use of such washes as require care in their preparation and use. The experience there has been that the best time to apply the wash is as late in winter or early spring as possible, just so the work is completed before the buds actually open, the advantage of this being that the coating adheres through a large part of the summer, and renders it difficult for the young to obtain a foot-hold. One thorough, annual treatment has been found sufficient, two or more being necessary only when trees have been neglected, or the scale not discovered until badly encrusted. By making the treatment late the growers also secure much fungicidal effect, so much so that many will hereafter use a late treatment for the scale, and also for its effect on fungi, thus taking the place of the usual late winter treatment with the Bordeaux Mixture. Indeed, from the present outlook it seems not unlikely that in many apple and pear orchards the scheme of spraying will eventually be as follows:—

1st. Just before buds burst with Lime-sulphur-salt.
2nd. Just after blooms fall with Bordeaux and Paris green.
3rd. Ten days later with Bordeaux and Paris green.

The southern method of jarring for the *Curculio* also deserves notice. Two men are engaged in the work of jarring a tree, each being provided with a semi-circular frame or screen large enough so that the two will include all the space directly beneath the branches. The two men walk rapidly along the rows, one on each side, and, bringing the screens together under each tree, a few quick, hard blows are given with a padded club. After some ten to thirty trees have been jarred in this way the screens are lowered to the ground and the jarring carefully searched for adult Curculios, which are crushed in the fingers. The method is quite rapid, two men having been observed to jar and kill the insects from 24 trees in 6 minutes. In the large commercial orchards this method is almost universal, and they find that the beetles appear first along the edges of the orchard, indicating that they hibernate in woods or fields, but I have never yet taken one of the insects in hibernating quarters. The growers make an effort to have each tree jarred at least twice a week, but still they prefer to give more attention to the outside rows, hence the trees bordering woods may sometimes be treated four or five times in the week while those in the interior may be jarred only once or twice.

Among insects not of economic importance this region is notable for a strong infusion of southern forms. Several times we sent insects to the National Museum at Washington representing species which they reported belong typically to the Florida fauna. The Orange-dog butterfly, *Papilio thoas* which has of recent years been taken even in Southern Ontario, is common in eastern North Carolina near the coast, though many years of careful collecting has failed to reveal it at Raleigh, about 120 miles inland. Here the handsome skipper, *Eudamus proteus*, is also found, and less than a month ago this species was taken at Raleigh for the first time. The swallowtail *Papilio palamedes* is also abundant through the summer near the coast. Among the Pierids, I think that *Pieris monuste* occurs, though this opinion is based only on a brief glimpse of a specimen taken to be this species on one of the low, sandy islands along the coast. The dragon-flies, *Libellula* and *Calopteryx sp.*, are also found here.

THE MIDDLE REGION.

This region lies about equally in the lower austral and upper austral zones. The typical soil is a red clay, but this varies to yellowish clay mingled with much sand and gravel in the east. The crops are corn, tobacco in the north, wheat in the middle, and cotton in the southern areas.

As the upper austral zone includes the southern tier of counties in Ontario, many of the insects of this region are well known in this province. The *Chinch Bug* is rarely reported in North Carolina from either the eastern or the western sections, but it is a standard pest in the middle section. Spraying with kerosene emulsion at a strength of 10 to 15 per cent. oil has been practised in a few instances but only with more or less injury to the crops, and our recommendation was to rely principally upon the well-known plowing methods, and our farmers were surprised to see how effectual even a single, deep, furrow was.

The Hessian Fly is another pest which is practically confined to this region, probably mainly because very little wheat is grown in the other sections. At any rate it is here a very destructive insect in the best wheat section of the state. Late planting is the preventative usually employed, and careful inquiry brought out the fact that from October 15th to November 1st is the safest time to sow to avoid fly and at the same time escape the injurious effects of winter freezing. Wheat is frequently sown as late as the last week in November, and I have been told of seeding in Xmas. week.

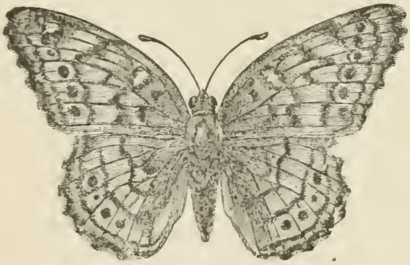

Fig. 9. Euptoieta claudia.

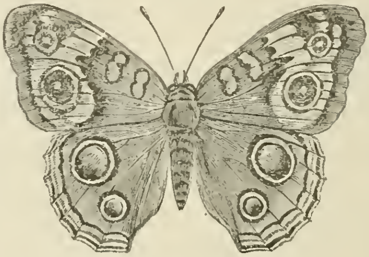

Fig. 10. Junonia cænia.

There are but few insects which I could name as distinctive of this region. One of the most characteristic butterflies is *Euptoieta claudia* (Fig. 9), the larvæ of which are everywhere common on the May-pop or Passion-flower. Another is the Buckeye, *Junonia coenia* (Fig. 10). Both of these butterflies are almost too southern in range to be expected in Ontario, though I suspect, without having inquired, that they are occasional in the southern counties.

[They have been taken, though rarely, in the Counties bordering on Lake Erie.—Ed.]

The Western Region.

This region is characterized by high plateaus and mountain ranges. It lies in the Transition and the Boreal life-zones. The Transition includes all of Old Ontario between the northern and southern tiers of counties, and the Boreal includes practically all of New Ontario and the great region about James Bay. Of course the more northern animals and plants of these regions are not represented in North Carolina, but one would be surprised at the similarity of the mountain plateau region and the country right here at Guelph. Cattle-grazing is one of the chief agricultural occupations, while hay, potatoes, oats, and apples are also standard crops. This is the only region where currants, raspberries, and rhubarb can really be said to be a success. Here, too, one finds many of the typical Ontario insects and insect pests. The currant bushes are regularly attacked by the currant worm, and the apple trees by the Oyster-shell scale, which is only known to me in this state in the mountain and west-central parts of the state. In the steep mountain orchards the dust-spray is being experimented with. As one apple-grower in this region has something over 30,000 trees now coming into bearing, the cheapest, efficient means of spraying the trees becomes an important question. *The Scurfy Scale* is more abundant here than elsewhere in the state.

Among the insects not of economic importance a specialist in lepidoptera could, doubtless, name many species well known to our most active collectors. Among the butterflies may be mentioned such forms as *Argynnis aphrodite, A. diana, A. cybele, Brenthis myrina, Grapta faunus, G. comma,* and *G. j-album.* I had threatened to capture *Basilarchia arthemis,* and *Vanessa milberti,* and even cherished a fond hope of finding a stranded colony of *Chionobas* on one of the high mountains, but further exploitation of this interesting region must now be left to others. But it is extremely interesting, as showing how mixed are the faunas in these southern mountains, to point out that in the extreme southwest corner of the state *Papilio thoas* (Fig. 11), and the Gulf Fritillary, *Agraulis vanillæ,* both appear to be somewhat common.

GENERAL OBSERVATIONS.

A more interesting territory for the entomologist can scarcely be found than North Carolina. Most of the collectors of insects are in the north, and when these collectors have gone south at all they have gone through to Florida, Georgia, Louisiana or Texas. Consequently there is a great strip of middle ground which has never been at all adequately explored. Even in economic entomology nothing definite has been attempted previous to the opening of this new century. The entomologist in this state is, therefore, met by persons of every conceivable attitude toward his work, some incredulous, some interested, some contemptuous, and some indifferent. The farming classes, as a whole, however, have in recent years been brought to see the importance of this work. The wide spread of the San Jose Scale, the threatening danger of the cotton Boll-weevil, and the almost total destruction of fruit crops by the Codling Moth and Curculio in the eastern section, have brought them to a realization of its true meaning.

For the five years that the writer was located in North Carolina, he, his assistants, and a Mr. Brimley, at Raleigh, were the only active collectors known to be residing in the state. Within the last few months another collector, a native of Connecticut, was discovered. Now there are two or three school teachers who are doing a little work along this line, though in a very primitive way. Altogether, the state is, as yet, practically unexplored, entomologically.

While spraying is gradually coming into vogue, the pumps are, as a rule, cheaper and more inefficient than those in use in the north. In order to get the practice started at all it has been necessary to begin at first in the simplest manner possible. But the poverty of the farming classes in past years, and the unreliability of the labor, would in any case have rendered the more expensive machines impossible. In the largest peach and plum section, where the San Jose Scale is generally distributed, barrel pumps with two leads of hose, each with a single nozzle, are principally used. Large tanks and heavy machinery could not be used here on account of the very sandy nature of the soil, through which the wheels readily sink so that heavy loads are impossible.

The generally prosperous years of recent times, and the development of enormous fruit and trucking industries throughout the south to supply the large and expanding northern markets, is giving cause for more demand for information, about insect pests and methods of combatting them, and at the present time more places are open for the employment of economic entomologists in the south than any other section, so far as the writer is aware, while it goes without saying that in regard to life histories, broods, hibernation, etc., much more remains to be discovered there than in the more northern states.

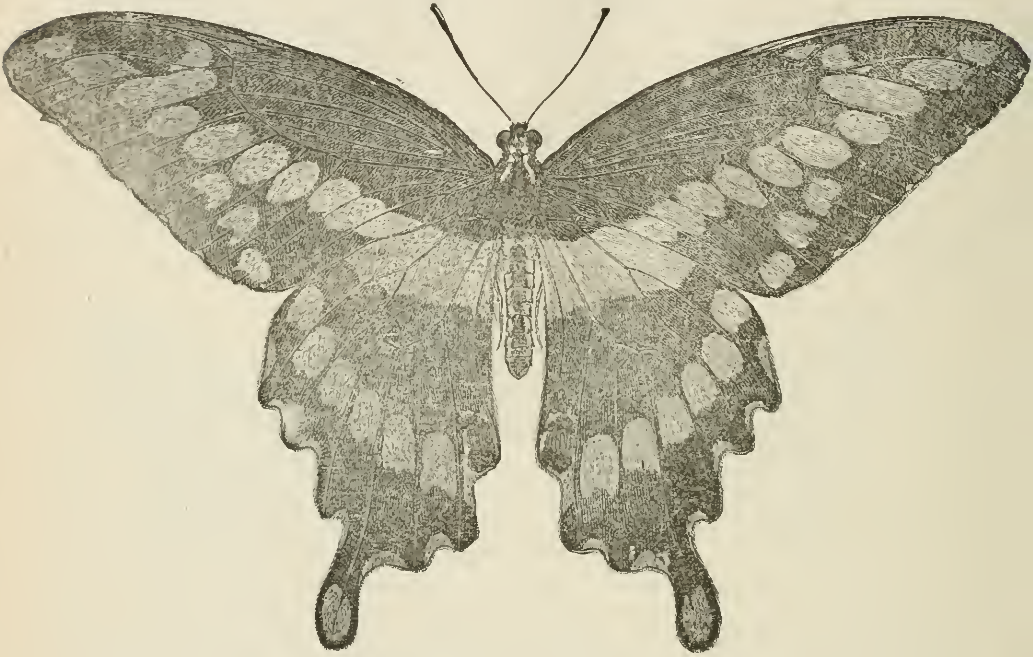

Fig. 11. Papilio thoas, the Giant Swallow-tail Butterfly. Colours black and yellow.

In the discussion that followed the reading of this paper, the first insect that was commented upon was Plum Curculio (*Conotrachelus nenuphar*).

Dr. Fletcher spoke in high terms of appreciation of Prof. Sherman's paper, and congratulated the Society upon the addition to its members of so able and enthusiastic an entomologist. He remarked that the Plum Curculio in Canada was kept in check almost entirely by spraying, and that jarring was rarely resorted to.

Mr. George E. Fisher had tried both methods, but preferred spraying, as it proved more effective, and had the additional advantage that a fungicide could be used with the Paris green, and thus a double result was accomplished. Mr. Willard, of Geneva, N.Y., whom he had visited, depended entirely upon jarring for the protection of his plum trees. He uses the wheelbarrow system, and employs twelve men, each with a barrow, for the purpose. As the Curculios are very susceptible to cold, the jarring is done in the early morning when they are sluggish and have a less firm grasp on their resting place. As many as a hundred of the beetles were often shaken from one tree. There was undoubtedly one advantage in jarring,—you killed the beetle for certain, whereas in spraying you only distributed poison for the insect to eat and could not be sure that he would partake of it.

Dr. Fletcher said that the cost of the labour required for jarring was very much greater than for spraying. Good paying results were obtained by the use of the latter method, and, as Mr. Fisher had stated, there was the great additional benefit derived from the addition of Bordeaux mixture to the Paris green or arsenate of lead. For his part, he much preferred to use, and always recommended to others, Paris green rather than the arsenate, as its conspicuous color prevented any danger of its being mistaken for anything else.

SAN JOSE SCALE.

Mr. G. E. **FISHER**, in the discussion on Prof. Sherman's paper, referred to the methods of dealing with the San Jose Scale, and first to the use of the lime, salt and sulphur mixture. He preferred to dispense with the salt as it corrodes the pumps, and in his experience the mixture destroyed the scale better without it. He used a heavy wash of the mixture, employing one pound of lime to half a pound of sulphur in each gallon of wash. It should be cooked *for two hours,* not for one only, as was the common practice. He made use of the steam from a threshing engine for the purpose, and cooked twelve barrels at a time, in order to have an abundant supply both for himself and his neighbours. The test of the boiling was that the mixture should finally turn green.

The results were most satisfactory. An orchard of one hundred trees of all sorts, badly infested with the scale, was treated three or four years ago with the wash made in the manner just mentioned and was sprayed thoroughly; no scales have been found there since. The wash should be applied by the middle of April, not later; he had found it safer to do the work from the middle of March to the middle of April, if later injury was done to the opening buds.

Prof. **SHERMAN** expressed the opinion that it was best to apply the wash as late as was safe, as he found that it stuck to the trees better and did good work for a longer time. His mixture consisted of 20 lbs. of lime, 17 lbs. of sulphur and 10 lbs. of salt to each 50 gallons. In an orchard containing 20,000 peach trees the wash had been tried both with and without the salt, and the results when the salt was included were much better than without it. The boiling was done for at least one hour and the spray was applied while hot. The advantage from the salt was that it made the wash stick better.

Prof. **LOCHHEAD** read the following paper in which he gave an account of his recent experiments in treatment for the scale.

EXPERIMENTS AGAINST THE SAN JOSE SCALE IN 1905.

BY WM. LOCHHEAD, PROFESSOR OF BOTANY, ONTARIO AGRICULTURAL COLLEGE, GUELPH.

During the eight years that the San Jose Scale has been in Ontario many remedies have been devised and applied for its extermination. Among the early remedies were whale oil soap, kerosene and kerosene emulsion, potash solution, soda solution, and dilute crude petroleum. All of these were only partially successful. The whale oil soap was a most effective destroyer of scale and a tonic for the tree, but was too expensive for the ordinary fruit-grower to use. The potash and soda solutions were not sufficiently effective against the scale to make them favorite remedies. Kerosene, either pure or dilute, was too unsafe, and was soon discarded. The kerosene emulsion, although quite effective in controlling the moving larvæ, was not at all adapted as a remedy for the scale under other conditions, and hence was abandoned. During the last few years new remedies have appeared and have been remarkably successful. Probably the most effective of these is the lime-sulphur wash. Various combinations of this wash have been tried, in order to determine the most satisfactory remedy for the scale, from the standpoint of both effectiveness and cheapness.

The following are the formulæ which have been usually adopted in Ontario for the preparation of these different combinations of the lime-sulphur wash:

The Lime-Sulphur Wash (fire or steam boiled):

Fresh lime	20 pounds.
Sulphur (flowers)	15 pounds.
Water	40 gallons.

With warm water make the sulphur into a paste; put in the lime and add about 15 gallons of warm water with stirring. The sulphur made into a paste may be added after the lime has been slaked. Boil for an hour and a half in a kettle or in a barrel with live steam. Make up to 40 gallons with hot water; strain into spray tank and apply while warm.

Some of our fruit-growers obtained excellent results by using larger proportions of lime and sulphur to the barrel, namely, 35 of lime and 20 sul-sulphur; 25 lime and 20 of sulphur. The time given to the cooking of the lime-sulphur wash is quite different in different localities, and even by fruit-growers in the same localities. In some cases the wash is boiled for an hour and a half to two hours, in other cases it is boiled for one hour, and many state that they have obtained good results by boiling for only one-half hour.

Lime-sulphur Wash (self-cooked):

Formula No. 1 Recommended by Mr. A. N. Brown, Wyoming, Delaware.

35 pounds of best stone lime.
17 pounds flowers of sulphur.
40 gallons water.

(1) Put the 17 pounds of sulphur into a vessel, add two gallons boiling water, a little at a time, stirring vigorously all the while until a fine paste is obtained.

(2) Put the 35 pounds of lime in another vessel, large enough to hold 40 gallons, pour into this lime 12 gallons boiling water; now add the sulphur paste previously prepared. Very quickly cover the barrel with a heavy burlap sack, having placed an old hoe into it first; now allow it to cook for 30 minutes. Do not stir, as that reduces the heat by letting in cold air, but with the hoe raise it from the bottom occasionally so that it does not run together and burn before the lime is thoroughly slaked. Nothing must be done to interrupt the cooking process, as that would affect the final quality of the wash.

(3) After this mixture has cooked 30 minutes, add 28 gallons of warm water, not necessarily boiling. Strain into the spray tank, and apply while warm, as in this condition it will flow through the spray pump nozzles more easily than when the wash gets cold. It will also remain in solution much more thoroughly when it is warm than when it cools.

Formula No. 2.

25 pounds good stone lime.
20 pounds flowers of sulphur.
12½ pounds sal soda.
40 gallons water.

Put 5 or 6 gallons of hot water in a wooden barrel, add the lime, quickly following with the sulphur and sal soda, and stir until the slaking is practically completed. It may be necessary to add a little cold water at intervals to keep the mixture from boiling over. After the violent action has ceased, cover the barrel to retain the heat and allow it to stand 15 to 30 minutes, dilute to the full quantity and apply.

Formula No. 3. (Geneva formula).
30 pounds of good stone lime.
15 pounds of flowers of sulphur.
4-6 pounds of caustic soda.
40 gallons of water.

In preparing the wash, the lime was started to slake with six gallons of water, and while slaking, the sulphur, which had just previously been made into a thin paste with hot water, was added and thoroughly mixed in with the slaking lime. To prolong the boiling of the wash, the caustic soda was then added with water as needed, and the whole mixture was kept thoroughly stirred. As soon as the chemical action had ceased the required amount of water was added, when the mixture was ready to use. Aside from the heating of the water, the cooking of the wash was done in a tub or barrel, and took from ten to twelve minutes. In some preparations, especially when hot water was used to start the slaking of the lime, not all of the stated amount of caustic soda was employed, but six pounds was the minimum.

Dr. Felt, New York State Entomologist, writing under date of Oct. 30th this year, advocates the employment of a lime-sulphur wash composed of 20 pounds of lime, 15 pounds of sulphur, and 40 gallons of water, bringing about the combination either by using 10 or 12 pounds of sal soda and starting the action by hot water in a barrel, or by boiling for at least 30 minutes.

It will be noted that salt has not been used in the preparation of any of these mixtures. In the preliminary experiments carried out three years ago by Mr. G. E. Fisher, he came to the conclusion that the presence of the salt added to the expense, made the wash more difficult to spray, and increased its corrosive action on the metal parts of the pump; while it failed to be any more effective as a destroyer of scale, or more adhesive to the bark of the tree. Whether these conclusions will be borne out by future experiments remains to be seen, but some observations made this year show that probably the presence of the salt is beneficial, and it would be advisable to conduct experiments this coming season to test this very point.

My observations this season would, I think, incline me to believe that the presence of salt renders the wash more adhesive, and hence more effective. I found, as a rule, that in those orchards where the mixture adhered longest and best to the bark the scale had made but little progress.

It would appear that the *adhesiveness* of the wash is a large factor in its *effectiveness*. The tremendous reproduction of the scale that occurs in September and October can hardly be checked, or the spread prevented, unless the bark has a coating which is either distasteful or harmful to the crawling larvæ. For this very reason that the bark is made clean and enticing to the larvæ during the last months of the growing season, other remedies fail to keep the scale in check, when only one application was made and that application in the spring just before the buds opened.

As to the results of the season's experiments with lime-sulphur, it may be stated in a general way that little or no difference could be observed between the effectiveness of the cooked and uncooked washes. Some orchards that had been treated with the cooked wash showed more scale at the end of the season than at the beginning, and the same results were observed in some orchards treated with the uncooked wash. On the other hand, it should be stated that both washes gave good results in many orchards. The reason for this variation in results is difficult to find; for example, Mr. W. H. Bunting of St. Catharines, who did not check the development of the scale with the cooked wash, is a most careful and thorough sprayer. On examination of Mr. Bunting's plum, peach, pear, and apple orchard in late October, Mr. P. W. Hodgetts and myself found the scale more abundant and more wide spread than at the close of any previous season. Like results were observed in Mr. Bunting's orchard at his home in St. Catharines. The scale had spread and partly encrusted many trees in spite of treatment with the cooked wash in the spring.

Mr. Titterington's orchard composed of peach and plum chiefly, just across the Welland Canal, was sprayed also in the spring with the cooked lime-sulphur wash. The trees near the road at the south end were fairly free from scale, but many trees at the north end were quite badly infested.

Mr. Irvine, near Queenston, on the Queenston Road, used the cooked lime-sulphur wash prepared according to the usual formula. The results might be said to be good in spite of the fact that there is now a sprinkling of scale in his peach orchard. Many of his Japan plums and a few of his peach trees, however, are badly infested. Mr. Muir, of Virgil, also sprayed with the cooked wash and speaks very highly of its merits. Certainly the condition of his trees at the end of October would seem to justify his opinion, for there was but a slight scattering of scale. This is saying a good deal when we remember that the scale is very bad throughout the Virgil district. In Mr. Muir's orchard the wash on the bark was quite visible in most of the trees up to the end of the season.

Mr. Lambert's orchard near the Welland Canal was sprayed thoroughly in early spring with the cooked lime-sulphur-salt wash. Two rows of Japan plums, badly encrusted last season, were in good condition, and the scale was not abundant. These trees showed very plainly the wash at the end of the season, and were perhaps the best in this regard of all the trees we examined. To my mind the presence of the salt made the wash more adhesive than that applied by his neighbors; moreover, it is very likely due to the extra adhesiveness of this wash that the scale was so reduced in numbers.

In the peach orchards of Mr. Porter Adams, on the Queenston road, near Queenston, the uncooked lime-sulphur wash was used. The results were good, although there was a slight sprinkling of scale throughout his orchard. Untreated trees were very bad, the bark being wholly encrusted. An interesting observation in this orchard is worth recording. There were three, and only three so far as we could find, badly injured peach trees in the sprayed orchard, and these were not close to one another. These received the same application as the other trees, but they are now encrusted with scale.

Mr. Bradley, near Mr. Adams, was not so successful with the uncooked wash. We are told, however, that the trees received a one-sided application on account of the high winds that prevailed at the time of spraying. The older trees of this orchard are now badly infested.

Mr. C. A. Secord used the uncooked lime-sulphur wash in his fine 16-acre peach orchard, and secured excellent results. Scale was there, but it was rather hard to find. The owner is perfectly satisfied with the results, and will use a similar wash next spring.

Mr. Beattie, Scale Inspector, of St. Catharines, tried Scalecide, Carlson's Mixture, and the uncooked lime-sulphur wash in his own orchard.

After examination of the trees we concluded that the last wash gave the best results, although scale was plentiful on all his trees in October, at the time of our visit.

As part of the experimental work for 1905, in addition to the lime-sulphur washes, Mr. P. W. Hodgetts and myself tried some new mixtures which had been advocated, viz., *Carlson's Mixture*, and *Pratt's Scalecide*.

In the peach orchard of the Industrial Home near St. Catharines, Carlson's Mixture, kerosene-flour, and uncooked lime-sulphur were used. The first two did not give satisfactory results, for scales were very abundant on trees treated by these mixtures; the last, viz., the uncooked lime-sulphur, in our opinion, did its work well, for scales were very scarce on trees treated by it. Here again, the wash was quite evident on the bark to the end of the season. The condition of these trees is remarkable when we bear in mind that across the fence is an untreated peach orchard which is terribly encrusted and rapidly dying. The few trees left untreated as checks are now very badly encrusted.

As I have already stated neither Scalecide nor Carlson's Mixture gave as good results in Mr. Beattie's orchard as the uncooked lime-sulphur. It appeared to us that in this orchard Carlson gave better results than Scalecide.

Carlson's Mixture and the kerosene-flour emulsion were also tried in a peach orchard belonging to Jas. Hutchison, near Virgil, the bulk of the orchard, however, remaining untreated. Results were far from satisfactory with both mixtures, the treated trees showing serious incrustation, although not quite as bad as those left untreated. This orchard furnishes an instance of the awful multiplication of scale in a single season. When the trees were sprayed on April 19th, a record was made in our note books to the effect that the orchard was comparatively free from scale, yet on October 24th, when we examined the orchard, the trees were very badly encrusted.

Scalecide and Carlson's Mixture were applied to some Japan plum trees belonging to Mr. Porter Adams, Queenston. Results were not satisfactory, as the trees are now badly infested.

A few Bartlett pear trees in Mr. Hodgett's garden, St. Catharines, were sprayed with the summer strength of Scalecide, but the results showed it powerless to control the scale.

Mr. Henry Kottmeier used Carlson's mixture on his plum orchard, but the results here too were far from satisfactory, and the majority of the trees are now badly infested.

In a small orchard near Mr. Kottmeier's, Carlson's Summer Mixture was applied, but it was not able to any extent to prevent the scale from multiplying. The treated trees are now badly infested.

Other examples of treated orchards might be stated, but enough has been given to show the values of the different mixtures as scale destroyers. None of the new mixtures, such as Carlson's, Pratt's Scalecide, or the kerosene-flour emulsion, can be recommended to the fruit-growers as effective remedies for the San Jose Scale. The lime-sulphur washes gave better results in every case that came under our observation.

We are not in a position to decide definitely whether the uncooked lime-sulphur wash or the cooked wash is the better remedy. To us it would appear that the personality of the man who makes and applies the wash counts in most cases for success or failure. Careful preparation of the wash according to formula, the use of good rapid-slaking stone lime, and thorough application to the trees will in nine cases out of ten check the scale completely. Moreover, we are of the opinion that the addition of salt to the wash would increase its adhesive qualities, and add to its effectiveness.

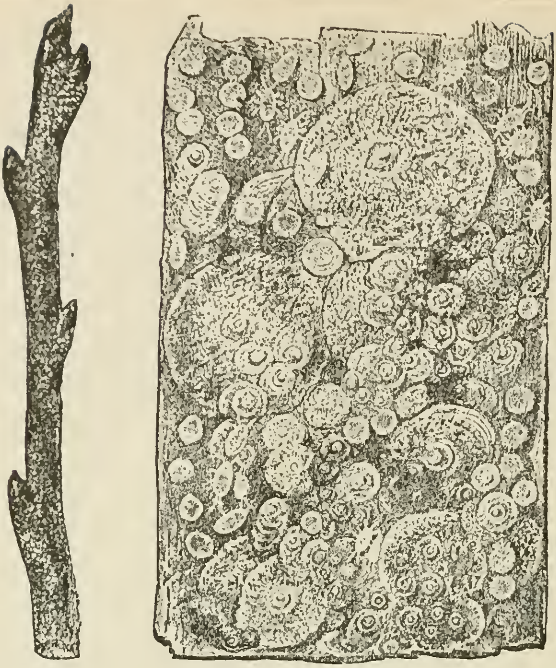

Fig. 12. San Jose scale: an infested twig, scales and larvæ on bark—much enlarged. (After Howard and Marlatt.)

Prof. J. B. Smith, upon being called upon by the Chairman, said that it was evident that the experience in dealing with the scale was in no two places the same. In New Jersey it was found that the effect of spraying with lime and sulphur was slow and cumulative; if properly done, no young were produced, and the results were very satisfactory. In Georgia, in a large orchard, containing over half a million trees, the lime and sulphur wash was used without any salt and with a larger proportion of lime than usual; the mixture, it was found, did not adhere so well to the trees. The next time salt was added to the mixture, but not much difference was to be seen in the results. The addition of salt made it spray more easily and spread better. In Georgia and elsewhere many fruit-growers think that the application of the lime and sulphur wash spoils the trees, and therefore they prefer to use the oil treatment, either crude petroleum or kerosene. Pratt's Scalecide, a preparation of soluble petroleum, was found satisfactory.

With lime and sulphur he found that the thinner the wash the better it penetrated: he recommended boiling the mixture because by so doing good results can be secured even with bad workmanship and inferior materials, and using equal parts of lime and sulphur. This mixture was effective on peach and plum trees. but was no good on apple and pear trees. An apple orchard was treated with this wash, and in June the trees were still coated, but they did not bear an apple worth marketing on account of the scales that covered them.

For apple and pear trees he recommended the oil treatment, using one part of petroleum with twenty of water. Spraying should be done as early as possible in the fall because many of the scales were still active and they were not so closely adherent to the trees as later on in the winter; the oil could therefore get at them better and destroy the insects. This method was very effective in keeping the scale in check, and we could not hope for extermination.

Dr. Fletcher, the chairman, in closing the discussion, said that it was evident that good results can be obtained in the contest with the San Jose Scale by using the crude petroleum treatment on apple trees and the lime and sulphur wash on peach and plum.

EVENING SESSION.

Wednesday, October 18th, 1905.

A public meeting was held in the Massey Hall at the Ontario Agricultural College, at 8 o'clock p.m., and was largely attended by members of the Society, students of the College and Macdonald Institute, and visitors from the city of Guelph. The chair was taken by Dr. Fletcher, the Vice-President.

President Creelman welcomed the Society to the Ontario Agricultural College and gave an outline of the different departments of work in it and the affiliated Macdonald Institute. They might be regarded as forming three main divisions: the College for training farmers' sons in all that relates to agriculture; the Farm for growing farm products and carrying on experiments in the cultivation of all manner of field crops, fruits and vegetables, the raising of stock, etc.; the Macdonald Institute, with its two-fold objects of training teachers from rural schools in nature study and elementary agriculture. for which purpose 45 or 50 came three times a year, and of teaching farmers' daughters the best methods of performing household work, such as cooking, sewing, laundry-work, dressmaking, millinery, etc.

Two of their departments of work could hardly fail to strike the average man, these were Agronomy or Field Agriculture, and Animal Husbandry; in the former, seeds of all kinds from all parts of the world are tried and their suitability for this Province tested. Experiments have been going on for some twenty years, some plants are found to be no good and are cast aside, others are useful forms or improvements on those in ordinary cultivation and are duly propagated and made known as widely as possible. About 2,000 plots are employed for this purpose and careful records are kept of each. The value of Animal Husbandry may be gathered from the fact that about eighty per cent. of the produce of farms is fed to live stock; it is therefore most important that farmers should know what is the best breed for his purposes and how the animals should be most advantageously fed and treated. In the spring two hundred farmers are brought here and shewn stock from both the farm and the neighbourhood, in order that they may learn all about them.

Other departments that may be briefly referred to are those of Chemistry for the analysis of soils, food products, fertilizers, etc.; Physics; Bacteriology; Horticulture for testing all sorts of fruits and vegetables; Dairying, a most important department, as it is worth millions of dollars to Ontario that the best butter and cheese should be made and exported; Poultry raising, for teaching the best methods and so reaping the largest profits.

The College is now visited in the month of June each year by farmers and their families to the number of 25,000 to 30,000, who are brought here from all over the Province by special excursion trains. Few of them probably return to their homes without having learnt something that they can turn to practical advantage in their own work. The College, too, is filled with young men who are taking long or short courses of study, and who go back to the farms with a training that will make them more progressive and successful workers, and who will influence for good all those in their own neighbourhood.

Dr. Fletcher, in reply, spoke of the high position the College had attained in public estimation and the great value of its work in improving in all departments the agriculture of the country. While its object was largely to teach how to increase and improve the products of the farm, the work of the Entomological Society was devoted to the saving of a proportion of the crops that would otherwise be destroyed by insects and be a serious loss to the farmer.

Mr. B. Barlow, the President of the Wellington Field Naturalists Club, welcomed the Society to Guelph and extended the cordial greetings of the Club. In the course of his remarks he mentioned that the Club had now been organized for five years, and during that time had devoted itself to the study of the fauna and flora of the County of Wellington, the aim being to make in time a complete biological survey of the district. So far, they had formed a list of over 200 birds observed in the county, with a record of dates, breeding, numbers, etc., and were not likely to add many more to it. In botany, flowers, plants, grasses, ferns, sedges, etc., were being collected and studied; fishes and other aquatic animals, mammals such as squirrels, moles, mice, etc., were also under observation. Fortnightly meetings were held either in the town or at the College and were well attended. He spoke with much gratification of the formation of the new Guelph branch of the Entomological Society, which had been completed this morning, and with which the Club would work hand in hand.

Dr. Fletcher acknowledged the kind greetings of the Club and stated that it was now widely known and had established an excellent reputation for careful work and accurate records. He then introduced the lecturer of the evening, Dr. John B. Smith, Professor of Entomology at Rutgers' College, New Jersey, and head of the Entomological Department of the New Jersey Agricultural College Experiment Station, a notable entomologist of world-wide reputation, one who was distinguished for his scientific work on nocturnal lepidoptera, his practical work in economic entomology and his important researches regarding mosquitoes and public work for their extermination in some badly infested regions on the coast of New Jersey.

The following is a brief abstract of Prof. Smith's lecture, which was illustrated with a large number of lantern slides made from original photographs and drawings.

A REVIEW OF THE MOSQUITO WORK IN NEW JERSEY.*

By John B. Smith.

Mosquitoes are essentially aquatic in the larval stage and none have yet been found that form an exception to this rule. As the larvæ of nearly all the troublesome species are known, and all breed in water, it is safe to plan for practical work on the assumption that the habit is universal.

Of the adult mosquitoes only the females bite, the lancet-like structures being undeveloped in the male which, necessarily, subsists on plant juices only. When a mosquito bites, it injects into the wound a minute drop of poison (saliva) and this seems to break up the blood structure so that it no longer forms a clot: a smear from the mosquito stomach spreads out thin and dries to a brittle scale.

That mosquitoes are active agents in the transmission of certain febrile diseases is no longer seriously questioned and, in general, it is agreed that they are also the only agents; the life cycle of the malarial Plasmodia being now fully understood. In a patient suffering from malaria the single celled protozoöns are present in the red blood corpuscles, each of which furnishes nutriment for one *Plasmodium* which matures and reaches the reproductive or sporulating stage in 24, 48 or 72 hours, according to its kind. When ripe, the cell bursts and the pores are discharged into the blood serum. As all the organisms mature at practically one time, this general sporulation upsets body conditions and a "chill" results. The spores work their way into new corpuscles and the cycle is repeated. After a time bodies are produced that make no attempt to enter new corpuscles; but remain in the blood serum. These are the "gametes" or sexed forms of the animal and they undergo no further development in man. If an *Anopheles maculipennis* now bites the patient, it will take in with the blood some of these gametes which, as soon as they get into the mosquito stomach differentiate. The smaller forms or micro-gametes produce "flagellæ," which break off and conjugate with the larger or macro-gametes, the product of the union forming a "vermicule," which works into the tissue of the mosquito stomach. This developes into a "zygote" and, in about a week that becomes mature, bursts and liberates into the body cavity, thousands of "blasts" which, sooner or later find their way into the salivary glands. Now, when such a diseased mosquito bites a healthy subject, some of the "blasts" are introduced into the wound with the saliva and, if the subject is susceptible, a case of malaria is established; the "blasts" working their way into the red blood corpuscles and starting the vegetative cycle.

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*Abstract of a lecture delivered at the evening meeting, Oct. 18th and illustrated with lantern slides.

The species of Anopheles select quiet pools of water bodies as breeding places and, floating on the surface can maintain themselves in shallows out of reach of most fish. The adults do not fly far and local work is likely to be be effective.

Some mosquitoes migrate or fly for long distances from their breeding places and among those are the species that breed in the salt marshes which occur so generally along the New Jersey coast. These breed as readily in salt as they do in fresh water and their influence extends inland 40 miles at least. In New Jersey this species is dealt with by ditching work, which gets rid of surface water before the larvæ have a chance to develop. The eggs of these migratory species are laid in the marsh mud and in that stage they pass the winter. The high tides of spring furnish water for their development and the broods begin early in May. The specimens that fly far inland are all females, and all of the migrants are infertile.

Filling as well as ditching is practised in some places, and much of the Brooklyn rubbish is gathered in huge tanks, transported on trolley flat cars and dumped on the marshes of Gravesend Bay near Coney Island, N.Y., to the material advance of comfort in that resort.

The common house mosquito, *Culex pipiens*, breeds anywhere and in liquids of all kinds from decently clean water to sewage and even liquid manure. It forms an egg boat and is the only species that agrees in all respects with the early published accounts of mosquitoes. It is not a carrier of any disease known in our climate and it is more as a first class nuisance than as a danger to health that it challenges attention. Local work is very effective against this species, and, indeed, only local work is likely to be of any benefit, since the species is not a traveller.

There is no sort of place where water occurs where mosquitoes will not breed, and even tree holes have their own fauna. In New Jersey one species of *Anopheles* and two species of *Culex* occur nowhere else.

The most marked recognition of the mosquito danger ever displayed was in the fight carried on against the recent epidemic of yellow fever at New Orleans, La. The surgeons in charge accepted the theory of transmission by *Stegomyia* only and bent all their efforts *first*, to the destruction of the *Stegomyia*, and *second*, to protecting patients and others from mosquito bites. As to the habits, etc., of this species I must speak at second hand, since it does not occur in New Jersey.

MOSQUITOES.

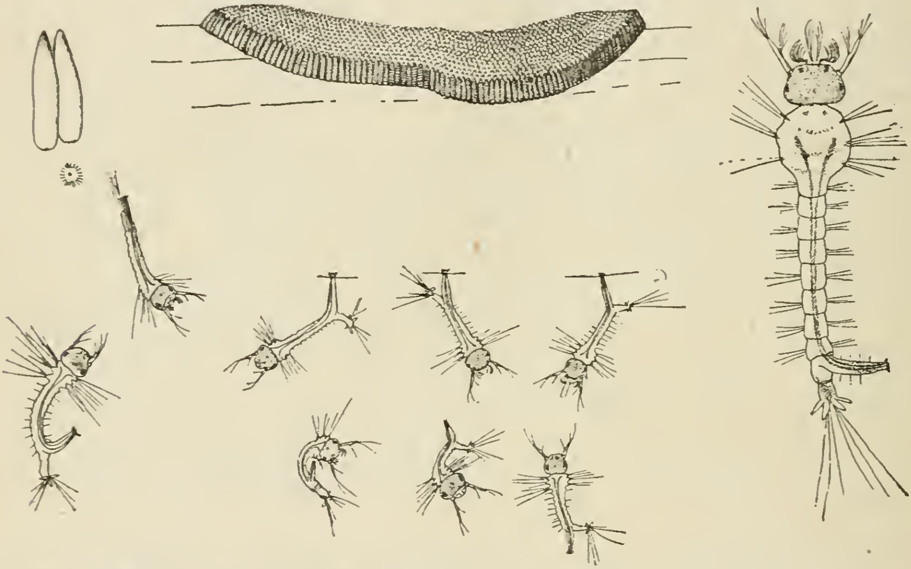

Fig. 13. Mosquito (Culex pungens) egg-mass above, with much enlarged eggs at left; larvæ on right and below. (After Howard, U. S. Dept. of Agriculture.)

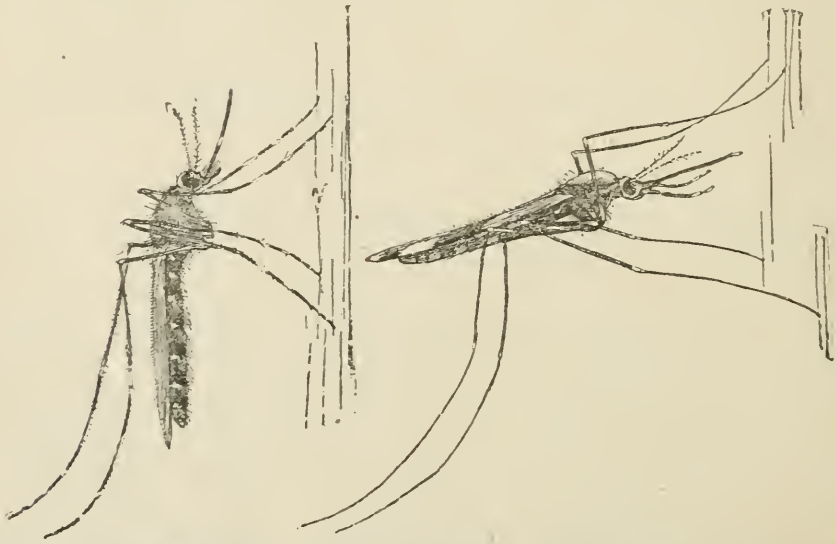

Fig. 14. Adult Mosquitoes at rest: Culex at left, Anopheles at right. (From U.S. Dept. of Agriculture.)

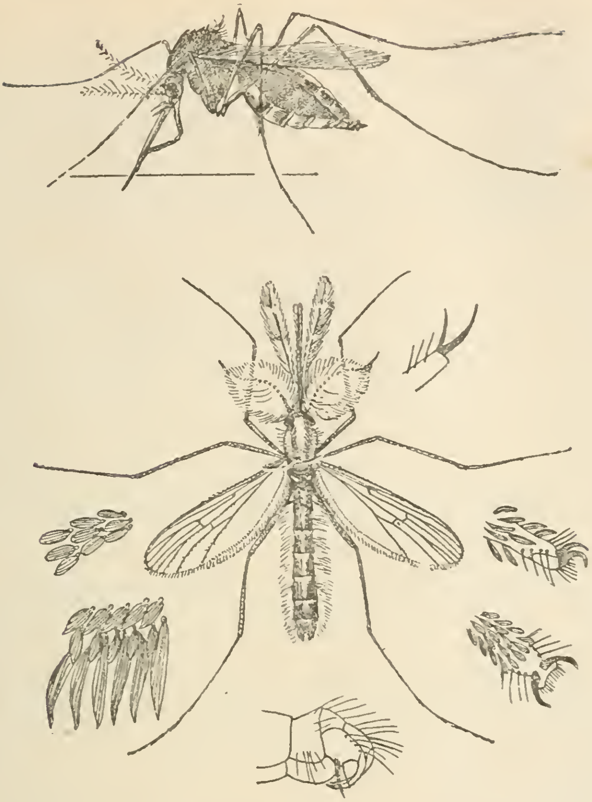

Fig. 15. Mosquitoes (Culex pungens) : female above, male below—different forms of scales. All greatly enlarged (after Howard, U. S. Dept. of Agriculture.)

At the close of the lecture which was listened to with marked attention and interest by the large audience, a hearty vote of thanks to Prof. Smith was proposed by Mr. C. C. James, Deputy Minister of Agriculture for Ontario, seconded by the Rev. Dr. Fyles, of Quebec, and enthusiastically adopted by the meeting.

SECOND DAY'S SESSION.

Thursday, October 19th, 1905.

The Vice-President, Dr. Fletcher, took the chair at 10 o'clock a. m. There were forty-six persons present and this number was increased during the morning.

MR. T. D. JARVIS, Lecturer in Entomology at the Agricultural College, read papers, illustrated by specimens, on insects collected in Jamaica; two species of Saw-flies (Lyda) taken at the College Farm; notes on the genus Phytoptus; three species of bumble bees that fertilize red clover at Guelph; notes on two species of Fenusa; and Parasites of the Abittibi country.

Papers were also read, and will be found in subsequent pages of this report, by Dr. Fyles on forest insects; Mr. A. Gibson on insects of flowering plants; Mr. Lyman on the Formation of an Entomologist's Union;* Mr. Zavitz on some forest insects; also a paper sent by Mr. J. Stevenson of Montreal on insects of the season.

During the sessions a large number of rare and interesting specimens were on exhibition and attracted much attention. Mention may be made of the following:

By Professor Sherman: some small collections of recent captures of local insects, to show his system of labelling; among them was a remarkable form of *Pyrameis cardui*, the Painted-lady butterfly.

By Mr. Zavitz: a large number of wood-boring insects (Cerambycidæ) collected at Ridgeway, Ont.

By Mr. T. D. Jarvis: a number of Jamaican insects, sawflies and other insects, referred to in his papers, taken at Guelph.

By Mr. LYMAN: a case of lepidoptera in which were interesting specimens of Gortyna and other noctuids, and also some rare diurnal Lepidoptera.

By Dr. Fyles: a number of forest insects in illustration of his paper.

By Mr. Young: a magnificent case containing over a thousand specimens of Micro-lepidoptera all most beautifully spread and mounted; also a number of Noctuids—these were all collected at Ottawa during the season of 1905. He also exhibited some living specimens of the grotesque pupæ of *Feniseca Tarquinius.*

By Dr. Fletcher: a collection of Lepidoptera made in the Yukon Territory by Mr. J. Keele of the Dominion Geological Survey Department; this included *Colias Boothii* and *Pelidne, Erebia Magdalena* and *Disa.*

By Mr. A. Gibson: a case of rare lepidoptera, inflated larvæ, and living larvæ of *Apantesis vittata* received from Mr. E. Denny of Montreal.

By Mr. C. W. Nash: specimens of a remarkable fungus growth (Cordyceps) on wire-worms.

Many of these exhibits will be found recorded, with dates and other particulars, in the "Entomological Record for 1905."

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*Published in the Canadian Entomologist.

REPORT OF THE COUNCIL.

The Council of the Entomological Society of Ontario begs to present its report for the year 1904-5.

The forty-first annual meeting of the Society was held in London on the 26th and 27th of October, 1904, and was well attended by local members as well as by many from a distance. There were also present Prof. H. F. Wickham, of the University of Iowa, Iowa City, an eminent coleopterist and an honorary member of the Society, and Mr. T. N. Willing, Chief Inspector of Weeds and Naturalist for the Department of Agriculture, Regina, N. W. T. During the first afternoon reports were read from the various Branches, Sections and Officers of the Society, and from the Directors on the notable insects of the year in their respective districts. Mr. Willing gave an interesting account of the methods adopted in the North-West Territories for controlling noxious weeds and dealing with injurious insects.

In the evening a public meeting was held at the Normal School at which the President, Professor Lochhead, read his annual address and Prof. Wickham gave an able and interesting paper, illustrated by a large number of lantern slides made from his own photographs, on "The Great Basin in the Western States and its Entomological Features." The second day was taken up with the election of officers and the reading of papers on a variety of entomological subjects. A large number of interesting specimens were also exhibited by the members present.

The 35th Annual Report on economic and general entomology was sent to the Department of Agriculture in January last and in due course was presented to the Legislature of Ontario and ordered to be printed. Owing to changes in the methods adopted by the King's printers and other causes for which we are unable to account, the volume has only just been published. The great delay impairs to some extent the value of the report, and has produced wide-spread complaints from members and correspondents in all directions.

In addition to the papers already referred to, the volume contains the following among other articles: "Insects injurious to Ontario crops in 1904" and the valuable "Entomological Record for 1904," by Dr. James Fletcher; "Notes on the Basswood, or Linden insects" and on "The Columbine Borer" by Mr. A. Gibson; "Insect Names and Insects Lists," by Mr. J. B. Williams; "Insects collected at light during 1904," by Mr. J. D. Evans; "Insects affecting the oak," and "the Food habits of certain Hymenoptera," by Rev. Dr. Fyles; "Notes on the Season of 1904 in Western Quebec," by Mr. C. Stevenson; "An elementary study of insects," by Prof. Lochhead; an obituary notice, with portrait of the late J. Alston Moffat.

The Canadian Entomologist, the monthly magazine of the Society, has been regularly issued. The 36th annual volume was completed in December last and ten numbers of volume 37 have now been published. The volume for 1904 consisted of 367 pages and was illustrated with four full-page plates, one of which was coloured, and a number of figures from original drawings. The contributors numbered 63 and included writers in Canada, the United States and England. The articles are for the most part scientific and contain, among much other highly valuable matter, descriptions of 217 new species and varieties and 11 new genera in various orders of insects. The material contained in the volumes of our magazine is so important and necessary to scientific workers that there is a constant demand from various parts of the world for complete sets or separate volumes and numbers.

During the winter months classes were held fortnightly on Saturday evenings for practical instruction in the elements of entomology as a basis for nature study work. They were attended by a number of teachers from the Public Schools in London as well as by other members of the Society The course was begun by Prof. S. B. McCready and after his appointment to the Macdonald Institute at Guelph, was continued by Dr. Bethune. When spring opened, the subject was changed to Botany, several outings to the country in the neighborhood were made, and the wild plants collected were carefully studied. Owing to various causes, especially to the absence or want of time on the part of the leaders, no formal meetings of the Sections were held. A number of popular lectures, illustrated by lantern pictures, were given by Dr. Bethune on insects and by Mr. W. E. Saunders on birds, under the auspices of various organizations in London and some of the neighboring towns.

Prof. Lochhead also has given lectures at several places on entomological and other subjects.

The reports from the branches of the Society at Montreal, Quebec and Toronto are highly satisfactory; great interest is taken in their proceedings by the local members and much good work has been accomplished.

The Council has much gratification in recording the formation of an active Branch in British Columbia, with head-quarters at Vancouver and an initial membership of eighteen; quarterly meetings are held and it is expected that, with so many energetic and enthusiastic members, rapid advancement will be made in the knowledge of the insect fauna of the Pacific Province.

To-day the Council has the additional pleasure of authorizing the formation of a Branch here at Guelph and welcoming the members to our annual meeting. The large number of members, no less than 24 at the outset and the presence of Professors and Students of the Agricultural College and Macdonald Institute, give the Branch a unique position and ensure its permanent success.

The Council desires to record its sorrow at the loss of one of its earliest Honorary members, Professor Alpheus S. Packard, M.D., who died at Providence, Rhode Island, on the 14th of February last. He was a distinguished entomologist, and author of a large number of books, both popular and scientific, on a variety of entomological and biological subjects: he also contributed from time to time to the "Canadian Entomologist." His name is held in high honour in Europe as well as throughout North America.

The Council has much pleasure in offering its hearty congratulations to Professor Lochhead on his appointment to an important position on the staff of the new Macdonald Institution at St. Anne's, P.Q., and has every confidence that, in his new sphere of active duty, he will continue to do good work in economic and scientific entomology and extend the influence of our Society.

To Professor Franklin Sherman, who has recently been appointed to the chair of entomology in the Ontario Agricultural College, the Council extends a cordial welcome, and feels assured that he will prove thoroughly efficient in his work and do much to encourage and direct his students in the earnest pursuit of this Department of Natural Science.

The outlook for the Society was never brighter or better, and the Council calls upon each member to do his share, in his own neighbourhood, in making investigations in insect life and extending the usefulness and influence of the Society.

All which is respectfully submitted.

JOHN D. EVANS,
President.

REPORT OF THE MONTREAL BRANCH.

The 267th regular, and 32nd annual meeting of the Montreal Branch of the Entomological Society of Ontario was held on May 8th, 1905, at the rooms of the Natural History Society.

The following members were present,—A. E. Norris, (President); A. F. Winn; D. Brainerd; Alfred Griffin; L. Gibb; G. Chagnon; E. C. Barwick; G. R. Southee; S. Robinson; Chas. Stevenson; Geo. A. Moore; H. H. Lyman; and four visitors.

Minutes of April meeting were read and confirmed, and those of the last annual meeting were taken as read.

The President read the following

Report of the Council.

The Council in submitting this report feel encouraged in knowing that the Society is not only keeping up its honorable traditions, but is going ahead in a manner worthy of the strenuous times in which we are now passing. Nine regular meetings have been held during the year, the average attendance being a fraction over 7. Twenty-six papers were read, viz.

President's address, Chas. Stevenson.
A talk on Lycaenidæ, A. F. Winn.
Hydrœcias, illustrated by colored slides, A. E. Norris.
Leaf Hoppers, Fam. Jassidæ, G. A. Moore.
Pontia rapæ, n. var. rhaphanus, C. Stevenson.
Notes on Saperda, G. Chagnon.
Cydnidæ—Burrowing Bugs, G. A. Moore.
Mompha eloisella, A. F. Winn.
Notes on some types, and other specimens in the Br. Museum, H. H. Lyman.
The water-lily moth, A. F. Winn.
Notes on travel, with random observations on Entomology, H. H. Lyman.
Brief notes on breeding specimens of the past season, H. H. Lyman.
Cercopidæ, or Spittle insects, Geo. A. Moore.
Notes on Canadian species of Donacia, G. Chagnon.
Notes on Hemiptera for season 1904, Geo. A. Moore.
Stenopelmatus fasciatus—The sand cricket, A. F. Winn.
Small-headed fly—Pterodontia flavipes, Gray, Chas. Stevenson.
Report on annual meeting at London, H. H. Lyman.
Berytidae, or Stilt-bugs, Geo. H. Moore.
More about Micro Lepidoptera, A. F. Winn.
Notes on the species of Saperda in my collection, C. Chagnon.
New Gortynas, H. H. Lyman.
Criocephalus obsoletus and Asemum moestum, a correction, G. Chagnon.
Agamic reproduction in insects, A. F. Winn.
How to describe larvæ, H. H. Lyman.
Hemipterous nymphs, Geo. A. Moore.

Field days were held at St. Hilaire, Que., May 24th and July 1st and at the Maisonneuve Woods on April 21st, 1905.

At the annual meeting held at London, the branch was represented by Mr. Lyman.

During the year two new members were added to the Society.

Respectfully submitted on behalf of the Council.

(Signed), A. E. Norris,
President.

The Treasurer submitted his report, showing a balance on hand of $58.71.

Reports of the acting Curator and Libarian were presented, and on motion of Mr. Winn, seconded by Mr. Brainerd, were received and adopted.

Mr. Norris read his annual address.

The election of officers for the coming year resulted as follows:

President, A. E. Norris, re-elected.
Vice-President, Geo. A. Moore.
Secretary-Treasurer, A. F. Winn.
Curator and Librarian, Chas. Stevenson.
Council, E. Denny, L. Gibb; H. H. Lyman, G. Chagnon.

It was decided to hold a field day at St. Hilare on May 24th and that the Council should also arrange for a suitable place to spend July 1st.

Mr. Winn reported that the President of the Natural History Society had invited the Branch to attend their outing at Mount Johnston, on Saturday June 10th, and in order to encourage entomological collections moved, seconded by Mr. Chagnon, that the Branch should provide two books suitable for entomological prizes to the Natural History Society for the best collections made on that occasion.

Mr. Norris gave a talk on butterflies and moths, illustrated by original, colored lantern slides. He was assisted at the lantern by Mr. Griffin.

The meeting then adjourned.

(Signed), GEO. A. MOORE.
Secretary-Treasurer.

REPORT OF THE QUEBEC BRANCH.

The annual meeting of the Quebec Branch was held on the 8th day of November, 1905, at the house of the President.

There were present: The Rev. T. W. Fyles in the chair, the Rev. W. W. McCuaig, Lt.-Col. Crawford Lindsay, J. H. Simmons, Esq., Mrs. R. Turner, Mrs. Simmons, Mrs. Poston, Mrs. Fyles, Miss Hamel, Miss Freeman, Miss Bickell, Miss Hedge, Miss W. Fyles, Miss Russell.

The minutes of the last meeting were read and confirmed.

Mr. A. R. M. Boulton was elected a member of the Branch.

The President then addressed the meeting upon some of the noteworthy entomological incidents of the year: the alarmist articles in the public press upon the larvæ of *Orgyia antiqua* and *O. leucostigma;* the interesting discovery by Mr. C. W. Nash of Toronto of a fungus that takes possession of the wireworm, much as *Cordyceps melalonthae* does of the white grub; the abundance of the spiny caterpillars of *Cynthia cardui* upon the burdocks and holly-hocks; the appearance at Quebec, in great numbers, of the cotton moth, *Aletia argillacea;* late captures including that of *Catocala relicta* at the electric light, etc.

The officers elected were: President, Rev. Dr. Fyles; Vice-President, Miss E. Macdonald; Secretary-treasurer, Lt.-Col. Crawford Lindsay; Council, Hon. R. Turner, Rev. W. W. McCuaig, Mrs. Turner, Miss Bickell, Miss Freeman.

Hearty votes of thanks were passed to the President and the Secretary-treasurer and the hostess of the occasion.

REPORT OF COUNCIL.

The Branch now includes 25 members (22 adults and 3 juniors).

The Treasurer's report will be submitted and will no doubt be found satisfactory.

During the year interesting lectures were delivered by the President.

The Council regret to have to record the death of one of the members, Mrs. Morgan. A resolution of condolence was passed and forwarded to the husband of the deceased, Major James Morgan, and to her relatives.

Our thanks are due to the authorities of Morrin College for having continued to allow us to use their rooms for our meetings.

CRAWFORD LINDSAY,
Secretary-Treasurer.

REPORT OF THE TORONTO BRANCH.

The ninth annual meeting of the Toronto Branch of the Entomological Society of Ontario was held in the Provincial Museum, St. James's Square, on June 22nd, 1905.

The President Dr. Brodie was in the chair, and the following members were present: Messrs. Paul Hahn, J. B. Williams, R. Hallam, M. Hallam, J. H. Webb, Dr. E. M. Walker, J. H. Maughan, Junr., and Dr. Abbott.

The Secretary, Wm. John Maughan, Junr., read the following report. "Your Secretary-Treasurer, has the pleasure to announce another year's statement of prosperity and advancement for 1904-5.

We have kept our membership up, and although some members have moved away, other new ones have joined.

The list of papers and lectures attached hereto have been splendidly descriptive and scientifically accurate, and not a few of them covered new and hitherto unknown material; some have been illustrated by lantern, others by specimens, charts, and drawings; putting before the members most completely all material connected therewith.

The attendance at meetings has been good, although the weather at times has not been propitious.

Your Secretary-Treasurer has also to announce that the Librarian-Curator has arranged and hung in the museum another large case of specimens, showing moths found in and near Toronto; also to thank members for their kind donations both of specimens and publications.

It is with sincere regret that your Secretary-Treasurer announces his withdrawal from the position he has held for some years past, and begs to thank the members, as a whole, for their kindness and courtesy shown to him on all occasions.

All of which is respectfully submitted.

(Signed) J. MAUGHAN, JR.,
Secretary-Treasurer.

List of papers read, 1904-5.

"The Leaf-cutting bee (Megachile brevis) and its Parasite", Dr. Brodie.
"A week at Lorne Park," J. B. Williams.
"Insects of North Ontario," G. M. Stewart.
"Galls of Oak," Dr. Brodie.
"Orthoptera," Dr. E. M. Walker.
"Scales on Butterflies Wings," J. B. Williams.
"The Tussock Moth and its Parasitical Life," Dr. Brodie.
"Dragon flies," Dr. E. M. Walker.
"A trip to Algonquin Park," Paul Hahn.

The following officers were elected for 1905-6:

President, Dr. Wm. Brodie.

Vice-President, Paul Hahn.

Librarian and Curator, J. B. Williams.

Council, Messrs. Leslie Walker, J. H. Webb, R. Hallam and Dr. Abbott.

Secretary-Treasurer, Mr. H. S. Saunders was elected, but he finds himself unable to accept the position, and another Secretary will have to be elected at the next meeting of the Society. Miss E. Blackmore, 242 Borden street, was subsequently elected.

The Treasurer's report shows the funds to be in a satisfactory condition with a balance of ninety cents on the right side.

GUELPH BRANCH.

The Guelph Branch at its meeting for organization has drawn up and adopted the following:

CONSTITUTION.

ARTICLE I. NAME.

The name of this Society is the Guelph Entomological Society—a Branch of the Ontario Entomological Society.

ARTICLE II. OBJECT.

The object of this Society is the increase and diffusion of the knowledge of insects.

ARTICLE III. MEMBERSHIP.

Section 1. Members shall be persons interested in insects. Members shall be elected by a two-thirds vote of the members present at any meeting.

Section 2. There shall be not less than six members resident in Guelph and vicinity.

ARTICLE IV. OFFICERS.

Section 1. The officers shall be a President, Vice-President, and Secretary-Treasurer, elected at the annual meeting to serve one year.

Section 2. The President shall preside at the meetings of the Society. The President and the Secretary-Treasurer shall sign all written obligations of the Society.

Section 3. The Vice-President shall assume the duties of the President in the absence of the latter.

Section 4. The Secretary-Treasurer shall record the proceedings of the Society and of the Executive Committee, conduct correspondence, and make an annual report. He shall publish due announcement of the meetings of the Society. He shall be Curator of the museum of the Society.

Section 5. The Secretary-Treasurer shall have charge of the funds of the Society, and shall make collections and disbursements and render an annual report, and his accounts shall be audited by a committee of the society annually.

Section 6. All new officers shall begin their duties on the first day after the annual meeting.

ARTICLE V. COMMITTEES.

Section 1. There shall be an Executive Committee consisting of the President, Vice-President, Secretary-Treasurer, and a student appointed by the President.

Section 2. The executive shall constitute a standing committee on programmes, publications, admissions to membership, research and finance.

Section 3. The society shall elect a delegate to the annual meeting of the Entomological Society of Ontario.

ARTICLE VI. FINANCES.

Section 1. The fiscal year of the Society shall begin on the first day after the annual meeting.

Section 2. The annual dues of members shall be one dollar, payable at the annual meeting, and the dues for the first year shall be payable on signing the constitution.

Section 3. Members whose dues remain unpaid one month after they are due shall be notified by the Secretary-Treasurer that within one month they will be in arrears and not entitled to a vote at the annual meeting, to receive the publications of the Society nor of the Entomological Society of Ontario. Members one year in arrears shall, after formal notification by the Secretary-Treasurer, be regarded as having withdrawn from the Society.

ARTICLE VII. MEETINGS.

Section 1. Regular meetings of the Society shall be held on alternate Wednesdays from October to June.

Section 2. Special meetings may be called by the President.

Section 3. The annual meeting shall be held on the first Wednesday in October.

Section 4. Six members shall constitute a quorum.

Section 5. The Executive Committee shall hold its regular meetings on the same days as the regular meetings of the Society; special meetings may be called by the President.

Section 6. The regular meetings of the Society shall be open to all.

ARTICLE VIII. PUBLICATIONS.

The Canadian Entomologist shall be the official organ of the Guelph Entomological Society. *The Canadian Entomologist* and the reports of the Ontario Entomological Society shall be sent to all members not in arrears.

ARTICLE IX.

The Society shall maintain a Museum.

ARTICLE X. AMENDMENTS.

These By-laws may be amended by a two-thirds vote of the members present at any regular meeting, provided the proposed amendments have been read at the last previous regular meeting of the Society.

The following officers were elected for the year 1905-6: President, Prof. Franklin Sherman; Vice-President, Richard Readwin; Secretary-Treasurer, T. D. Jarvis; Executive Committee, Messrs. Sherman, Jarvis and Klinck.

REPORT OF THE LIBRARIAN AND CURATOR.

During the year ending August 31st, 1905, thirty bound volumes have been added to the Library, making the total number on the register 1,862; also a large number of periodicals and pamphlets. Among the new acquisitions may be mentioned the fifth volume, with plates, of Sir George Hampson's "Catalogue of Lepidoptera Phalænæ" in the British Museum. During the year 27 volumes were issued to local members.

A card catalogue according to subjects has been begun and all the bound volumes of pamphlets have been indexed in this way as well as a number of entomological bulletins and reports.

The collections have been increased by the kind contribution of 123 specimens of Coleoptera, including 113 species, by Prof. H. F. Wickham of Iowa City, who took note of the blanks in the cabinets when he visited the Society during the last annual meeting. The President, Mr. J. D. Evans, sent 50 specimens of beetles, including 16 species, new to the Society's collection. Mr. J. A. Balkwill throughout the summer has brought in a large number of specimens of various orders, especially Lepidoptera and Coleoptera, and Mr. J. A. Morden, of Hyde Park, has presented some rare specimens of nocturnal Lepidoptera, for all which the Society is deeply grateful.

The Curator would repeat his desire to receive specimens of almost all of our Canadian insects to fill blanks in the cabinets and to replace old and imperfect examples; also to have the specimens provided with labels giving the important information of locality and dates of capture, etc. Any member who has specimens to spare, and every one must have some, will confer a favour by first sending a list of those he is willing to present to the Society in order to prevent unnecessary duplication. The collections of Lepidoptera and Coleoptera from Ontario and Quebec are fairly complete, but in other orders the Society is very badly off.

The number of visitors is satisfactorily, advantage being taken of the opportunities to inspect the Library and collections during three afternoons in each week, when they are open to the public.

Respectfully submitted,
Charles J. S. Bethune,
Librarian and Curator.

REPORT OF THE TREASURER.

Receipts and Expenditures of the Entomological Society of Ontario for the year ending August 31st, 1905.

Receipts.		Expenditures.	
Balance on hand September 1st, 1904	$445 74	Annual Meeting and Report	$91 85
Members' fees	340 71	Salaries	275 00
Legislative grant	1,000 00	Postage, stationery, etc	146 29
Sales of pins, cork, etc.	43 59	Printing	753 77
Sales of Entomologist	174 10	Pins, cork, etc.	16 31
Advertisements	41 44	Rent	171 25
Interest	7 63	Insurance	48 80
		Library	32 18
		Balance on hand	517 76
	$2,053 21		$2,053 21

J. A. Balkwill, Treasurer.

Audited and found correct.

F. A. Stuart,
W. H. Hamilton, Auditors.

REPORT FROM THE ENTOMOLOGICAL SOCIETY OF ONTARIO TO THE ROYAL SOCIETY OF CANADA.

Through John D. Evans, Delegate.

During the past year the Entomological Society of Ontario has drifted along in its usual even tenor, doing good work and progressing steadily and has passed the upwards of two score years of its existence.

The forty first annual meeting was held in October last, in its new, commodious and accessible quarters in the Public Library Building, Queen's Ave., London, the attendance being good, and among those present were four representatives of the gentler sex. From a distance may be mentioned the presence of Mr. T. N. Willing, Chief Inspector of Weeds for the Department of Agriculture, Regina, N.W.T., and from among our neighbors from across the border we gladly hailed the presence of an oft contributor to our magazine in the person of Prof. Wickham of the University of Iowa, Iowa City.

After the usual routine of business at the morning session the President opened the proceedings in the afternoon, at which the reports of the several Directors on the injurious insects of the year were read.

A feeling reference was made to recent death of the valued and faithful Curator and Librarian, J. Alston Moffat.

Mr. T. N. Willing presented a most interesting account of the methods inaugurated for the eradication of the noxious weeds in the North-west Territories, following which, Prof. Lochhead read his paper on the injurious insects of the year in Ontario.

The reports from the Toronto and Montreal Branches were also read.

A very largely attended and appreciative meeting was held in the evening in the Normal School presided over by Dr. Jas. Fletcher, at which Prof. Lochhead read his Presidential address on "Recent Progress in Entomology," and Prof. Wickham gave a most interesting lecture illustrated by a large number of beautiful lantern slides on "The Great Basin in the Western States and its Entomological Features."

The 35th annual report of the Society to the Legislature of Ontario has been presented in which is given a full report of all the papers read at the annual meeting. In addition to the afore-mentioned the following of the most important contributions may be enumerated, viz.,—

"Insects Injurious to Ontario Crops in 1904," and "Entomological Record 1904," by Dr. Fletcher.

"Further Notes on Basswood or Linden Insects," and "Notes on the Columbine borer," by Arthur Gibson.

"Insects Collected at Light during 1904," by J. D. Evans.

"Spining Methods of Telea Polyphemus," by J. W. Cockle.

"Insect Names and Insect Lists," by J. W. Williams.

"Notes on the Season of 1904 in Quebec," by C. Stevenson.

"Insects Affecting the Oak," and "On the Food-Habits of Certain Hymenoptera," by T. W. Fyles.

"An Elementary Study of Insects," by Wm. Lochhead.

"The Pear Tree Psylla and How to Deal with It," by G. E. Fisher.

Obituary notice of the late John Alston Moffat.

The foregoing is termed the annual report; in addition to this is published monthly the magazine, *The Canadian Entomologist*, now in its 37th year.

The 36th volume (being for 1904) consists of 367 pages, has four full-page plates and a number of cuts from original drawings. The contributors are 63 in number, embracing thirteen Canadian, thirty-nine in the neighboring Republic and one in England.

The papers cover all the important orders of insects, such as Lepidoptera, Hymenoptera, Diptera, Coleoptera, Orthoptera, Hemiptera, and Neuroptera, throughout which are described 217 new species and varieties and 11 new genera.

The papers being too numerous (being upwards of one hundred, besides numerous short paragraphs, book reviews and obituary notices,) to designate all by title; a few of the more important may be mentioned such as,—"Classification of the Fossorial, Predaceous and Parasitic Wasps, or the Super-family Vespoidea," by Wm. H. Ashmead; "Several New Diptera from North America," by D. W. Coquillett; "Notes on North American Stratiomyidæ," by A. L. Melander; "New Noctuidæ from British Columbia," by Harrison C. Dyar; "Synopsis of Anthopila," by Charles Robertson; "The Diptera of British Columbia," by James S. Hine and Raymond C. Osburn; "Synopsis of Bees of Oregon, Washington, British Columbia and Vancouver," by H'y. L. Viereck, *et al.*; "New Tortricids from Kaslo, B.C., and the Northwest," by W. D. Kearfott; "Descriptions of Some New Species and Varieties of Canadian Butterflies," by Dr. Fletcher; "The Crickets of Ontario," also "Notes on the Locustidæ of Ontario," by E. M. Walker; "New Noctuidæ for 1904," by Prof. John B. Smith; "New Species of North American Lepidoptera," by Dr. Wm. Barnes; "Synopsis of Prosopis and Colletes with Supplementary Notes and Descriptions," by Charles Robertson; "New Species of North American Asilidæ," by E. A. Back; "On Some New Coleoptera, Including Five New Genera," by Thos. L. Casey; "A Review of Our Geometrid Classification," by Richard F. Pearsall.

"The British Columbia Entomological Society" has recently become affiliated with us and is now the *B. C. Branch* of the Entomological Society of Ontario. Thus are we "lengthening our cords and strengthening our stakes."

During the winter months regular classes have been held fortnightly in London for the study of entomology under the direction of Mr. S. B. McCready, Science Master of the London Collegiate Institute and now Nature Study Professor at the Macdonald Institute, Guelph, assisted by Dr. Bethune.

These meetings have been well attended, chiefly by teachers in the public schools of the city.

Similar instruction has been begun in botany and will be carried on during the summer, excursions being made for specimens to different parts of the surrounding country.

A number of lectures illustrated with lantern pictures on noxious, beneficial and interesting insects have been given by Dr. Bethune in London and a few places in the neighborhood.

Prof. Lochhead of Guelph has given lectures on similar subjects in Hamilton and elsewhere.

The Library and collections of the Society are open to the public on three afternoons in each week and attract a fair number of visitors.

AFTERNOON SESSION.

Thursday, October 19th, 1905.

The Vice-President, Dr. Fletcher, took the chair at 2.30 o'clock, p. m.; there were about eighty persons present. The first business of the session was the election of officers for the ensuing year, which resulted as shown on page 2.

Prof. SHERMAN, who has been recently appointed to the chair of Entomology at the Ontario Agricultural College, on being called upon, said that his duties were confined to entomology in all its bearings and departments, now that is was separated from the teaching of botany and other subjects. Among other objects he had especially in view the formation of a representative collection of the insects of all orders to be found in the Province of Ontario, and a catalogue giving dates, localities, etc. He intended that every specimen should be properly labelled so as to give all necessary data regarding it, and he exhibited some recent captures showing his method of labelling. He expected that the Entomological Society would help the College and the College would certainly help the Society.

The Chairman then read the annual address of the President and expressed the regret that was felt by all at the absence of Mr. Evans.

ANNUAL ADDRESS OF THE PRESIDENT.

BY JOHN D. EVANS, C.E., F.L.S., TRENTON.

It is with the utmost diffidence that I presume to present to you this, the President's Annual Address, on this auspicious occasion, being the first meeting of the Society at the fountain-head of economic entomology for the Province of Ontario, the Ontario Agricultural College at Guelph.

Owing to pressure of official duties in my professional capacity for some months past, it has been quite impossible for me to prepare anything upon a special subject bearing upon the all-absorbing, instructive and useful pursuit, the study of insect life. I trust, therefore, you will kindly bear with me in the few brief remarks I may have to make and pardon me for not providing you with the intellectual treat you are usually regaled with upon like occasions.

We have met together to transact the (always) important duties attendant upon the annual meeting, and we should heartily congratulate ourselves upon having reached the 42nd annual gathering of the Society without a break or misstep either in its annual meetings or publication of its magazine for such a length of time. It is the oldest extant on this continent, I believe, save one, and is held in the highest esteem not only over the length and breadth of this continent, but also in the remote parts of the Old World. And its publication (the monthly magazine) includes among its many contributors most of the leading specialists from among our very helpful neighbors across the border, as well as occasional ones from the other side of the salt water. Nor should we omit to refer to the annual reports of this Society to the Ontario Department of Agriculture, now numbering thirty-five, which are replete with the most useful information regarding the life histories of insects, the methods of dealing with the injurious ones, and preserving the garden, orchard, and farm crops from their ravages. These reports are very much sought after, not only by those for whom they were especially prepared (the sufferers), but also by the entomologists and entomological societies the world over.

Great strides are being made in the study of the insect fauna generally, but more especially has attention been directed of late to some of the, heretofore, most neglected orders, the Orthoptera and Diptera coming well to the front, particularly the last mentioned, which has been recently catalogued by Prof. J. M. Aldrich of the University of Idaho, the species now numbering 8,300 as against 2,500 catalogued in 1878 by Baron Osten Sacken and following closely, numerically, the Coleoptera and Lepidoptera.

Among many other assiduous workers in the field on this continent who are doing good work, adding largely to the knowledge regarding their several specialties, may be mentioned Dr. J. B. Smith in the Noctuidæ, Rev. Geo. W. Taylor in the Geometridæ, and Mr. W. D. Kearfott in the Micro-Lepidoptera.

We are deeply indebted to a large number of the American specialists, among whom may be mentioned Dr. L. O. Howard, Dr. Harrison G. Dyar, Mr. D. W. Coquillet, Dr. W. H. Ashmead, Dr. Henry Skinner, Mr. E. P. Vanduzee, and Prof. H. F. Wickham, for their many patient and self-sacrificing acts in examining and naming species in the various orders for the Canadian collectors and students.

Much literature on entomological subjects has been produced during the past year, but foremost among them may be classed "American Insects," by Prof. V. L. Kellogg, of Leland Stanford, Jr., University, which is profusely illustrated with colored plates and figures in the text and provides a very valuable work for the use of nature observers, natural history students, and of general readers. Also in this category may be added "A Synonymic Catalogue of the Erycinidæ of the World," by Levi W. Mengel of Reading, Penn.

We are sorry to learn that our worthy Past-President and genial and indefatigable worker, Prof. W. Lochhead, is about to withdraw his valued services from the Ontario Agricultural College to become the Entomologist at the new Agricultural College at St. Anne's, Que., which has been founded by Sir Wm Macdonald, but although he may be somewhat further removed geographically, still we hope to always have his presence at our meetings in the future and counsel in matters pertaining to the welfare of the Society, and help and assistance in time of need. We have no doubt that his successor, Prof. Sherman, a student under Prof. Comstock, and of much experience, will prove to be the right man in the right place, and carry on the work at the College in the same thorough and painstaking manner as has been done under the regime of his predecessor.

The passing season has been, so far as I am aware, and from my own experience and observation, a very poor one for insects, generally speaking very wet, somewhat similar to the two last preceding seasons. Consequently insect life in many ways has not flourished. The forest tent caterpillar (*C. disstria*) seemingly has disappeared entirely and the presence of the Fall webworm (*H. textor*) very rarely seen.

The County of Prince Edward and the surrounding district has been noted in the past for large crops of high grade pease, but of late years the Pea-weevil (*B. pisi*) has been so destructive that the crop has been almost ruined. A great warfare has been waged against this insect pest through the instrumentality of the leading members of this Society, to wit, the active workers in this department at the Central Experimental Farm at Ottawa and the Ontario Agricultural College at Guelph. For about two years the pea crop was almost eliminated from the farming community with the hope that the shortness of the food plant would wipe out the pest. This apparently has come to pass, for this year again a very large acreage has been sown, resulting in a most bountiful crop with very little, if any, ill effects from the weevil. It is to be hoped now that those interested will take to heart a lesson from past experience and use all the means available, which have been so thoroughly advertised and disseminated by the officers above-mentioned throughout the length and breadth of the country, so as to keep the pest within due bounds.

I learn that the San Jose Scale and Codling moth are also well under control by means of the spraying methods practised under the leadership and guidance of the afore-mentioned officers through the instrumentality of this Society.

The White Cabbage butterfly (*P. rapæ*) and Yellow Clover butterfly (*C. philodice*) have been very numerous in places late this season, but they have not apparently done any serious damage.

Nature study is a subject gaining much strength and being taken up among the schools all over the country, and is now one of the subjects recommended by the Educational Department of Ontario. Steps are being taken at this time to take up the subject in the Trenton schools, and its rootlets have taken hold in most remote outlying districts, even to the most northern extremity of this County of Hastings.

This subject has repeatedly been brought before the notice of the public by various members of this Society, lectures having been given in London and various places in the neighborhood, at Guelph, Hamilton and elsewhere, by Dr. Fletcher, Dr. Bethune, Prof. Lochhead, Prof. McCready, and others. Particular mention must be made of Prof. John Dearness, who has recently produced "The Nature Study Course," a book designed for the use of those interested in the education of the young, both boys and girls.

In furtherance of this most commendable study, reference should be made to an illustrated paper, "Practical and Popular Entomology," "Entomology in Schools," by Mr. H. S. Saunders, of Toronto, which appeared in our magazine in the February issue of this year, as being deserving of emulation by other members of our Society.

After the remaining papers on the programme had been read and discussed (they will be found in succeeding pages of this report), PRESIDENT CREELMAN expressed the pleasure which it had given him and the members of the College to have the annual meeting of the Society in their buildings, and on behalf of the students in Biology, the Wellington Field Naturalists' Club and the Entomologists, he asked the Society to meet at the Guelph College as often as it possibly could.

Prof. H. L. HUTT joined in this expression of gratification and said that he had been especially pleased to meet and make the personal acquaintanceship of many veteran entomologists whose names had long been familiar to him.

Prof. LOCHHEAD spoke of the importance of this meeting to the students, who would receive a lasting inspiration from it.

Votes of thanks were unanimously passed to President Creelman and his staff for their kindness and hospitality; to Prof. J. B. Smith for his welcome visit and most interesting lecture; and to the reporters of the Toronto *Globe*, the Guelph *Herald* and *Mercury*, and the Toronto *Weekly Sun*, for their excellent accounts of the proceedings.

INSECTS AS NATURE STUDIES.

By S. B. McCready, Professor of Nature Study, Macdonald Institute, Guelph.

My interest in this topic is not that of an entomologist, but that of the schoolmaster. To the student of insect life nothing, perhaps, is more natural as nature studies, than insects; nothing perhaps is more likely to awaken readier interest and develop powers of careful observation; nothing in animal life has much, if any, greater concern with our lives. But while our teachers are quite ready to acknowledge that the study of insects may profitably be admitted to a place amongst the multitude of school studies, they are, as a class, quite at a loss to know how to commence the study of them. They feel afraid, or helpless, or rebellious, or indifferent. They feel that they have been imposed upon; they have been trained and accepted into a work which is suddenly changed; sometimes it is hinted that their inability to handle the work is through fault of theirs to readily adjust themselves to new conditions; in fact through insects and the other "what-nots" of nature studies, the conscientious teacher's burden has become considerably heavier in these later days.

Here are the insect studies prescribed for Manitoba schools, *e.g.*:

Grade I. Butterflies and moths. Reference to color, beauty, movements, etc.; study of simple life-history of butterfly or moth; preparation for winter by insects.

Grade II. Observation of habits of the ant, bee, wasp, and grasshopper.

Grade IV. The House moth. The eggs, the larva, the cocoon and pupa, the imago, the egg; or the study of a wasp in nest making, feeding young, guarding young, and in winter season.

Grade V. Insect life in relation to the shade trees: aphis, caterpillar and leaf gall of maple suggested; rearing mosquitoes and butterflies from eggs in order to obtain life histories; recognition of lady-bird beetle with a view to protecting it. Finding the larvæ on trees infested by aphids; observation of insect life in an old log, a rotten stump, a sand hill; incidental observation of insect life.

Grade VI. Interdependence of insects and flowers; special study of grasshoppers; finding the eggs, observing young hoppers, and growth of their wings; the most favorable weather, food how eaten, behaviour in wet and windy weather, etc.

Grade VII. Cockroach and field insects. Simple classification of insects according to character of wing.

Grade VIII. Insects of field, Bee.

This is the outline of insect work for the Manitoba teacher in the Public Schools, and is like that for Ontario schools, except that it is more specific—the Ontario outline is expressed in general terms *e.g.*, in Form IV. the work is life histories of conspicuous and economic insects; organs and functions.

With most teachers, even those who have had advantages of University training, there has never been an awakening of interest in insect life—life histories, moths and butterflies, aphids, beetles, larvæ, galls, caterpillars, cocoon, pupa, imago, egg—such terms mean very little, if anything. They are cut off from helping themselves as they may do in other subjects; the work demands actual personal observation if it is to be rightly presented: they cannot read ahead of their classes as in history, geography, and arithmetic and make proper presentation of the subject; it isn't in books. In fact it needs quite another kind of adjustment, a humiliation, a really putting of oneself into the child's position and attitude. This is hard. No other subject demanded it, the teacher has, in many branches of school work, grown away from the child's atmosphere, but here it is only by becoming as a little child that success may be won.

But while the teacher is learning of insects in this way it is slow, and with the demands of other studies upon him, disheartening; advanced classes will be demanding greater knowledge than patient independent investigation could attend to in many years,—the teachers must be helped; in the multiplicity of text-books there is confusion, even if they should be able to secure them; and many of the books are more hinderance than help on account of being over technical or too exhaustive; the school inspectors can very seldom help much, and without help from books, or superintendent, the teacher may be unintentionally working harm to a good cause; may in striving for the same end in nature study as he does in many other subjects—the acquirement of facts—defeat its chief purpose—the development in our boys and girls of a sympathetic, patient, independent outlook on nature.

The Entomological Society of Ontario and its members can do a great deal to help on the work—as indeed they have done already.

There should be some means adopted by our Department of Education whereby articles such as that of Dr. Fletcher's on the Clover Butterfly, published in the Ottawa *Field Naturalist*, and the articles on economic insects appearing in our Annual Reports, could be put into the hands of every school teacher and school inspector in Ontario, and *free, it has to be free*, and with clear instructions for adapting the work to the schools. There is a large field of usefulness for our *Canadian Entomologist* in offering through the Department of Education special articles in insect studies suited to our schools. At the present juncture, since travelling instructors or local centres of instruction are impracticable, and the University is not helping, these are the best means I can think of for helping our teachers, and our boys and girls in a rather puzzling situation.

NOTES ON THE SEASON 1905 (WESTERN QUEBEC).

By Charles Stevenson, Montreal.

Insect collecting this season has been interesting on account of the quantities of several species of butterflies that appeared. But it has been somewhat disappointing in the captures of rare species and varieties.

In Lepidoptera our old friends *Vanessa atalanta*, Linn., *huntera*, Fab., and *cardui*, Linn., have been very plentiful; in fact in some localities more prominent than the common *Pontia rapæ*, Linn., and *Eurymus philodice*, Godt., the *Albinic* variety of the latter being prominent. Over twenty-five specimens were captured by Messrs. G. Chagnon, E. Denny and myself on the 28th Sept., in a small patch of ground in Outremont, near Montreal. The one-time-common *Anosia plexippus*, Linn., which had almost disappeared last year, showed up more frequently. A fine fresh specimen was caught as late as the 3rd Oct., near Montreal.

Owing to the activity of the collectors this year, four separate localities around Montreal are now known to be frequented by *Stenopis thule*, Strecker.

Great prominence was brought before the public of Montreal by the ravages of the Tussock moths. Three species were found, *Notolophus antiqua*, Linn., *Hemerocampa leucostigma*, S. & A., and *definita*, Pack., *leucostigma* being the most plentiful and *antiqua* rare. Considerable amusement was given to the entomologists by the ridiculous methods adopted by the authorities to exterminate them, the chief one being to scrape the egg-masses off the trees and leave them on the ground.

Good work has been done by Mr. E. Denny in rearing caterpillars, especially in procuring varieties of *Apantesis vittata*, Fab., and great credit is due to this gentleman for his patience and perseverance in bringing other lepidoptera larvæ to maturity.

Mr. G. A. Moore continues to do good work in the study of Hemiptera.

Messrs. H. H. Lyman, A. E. Norris, and A. F. Winn have continued their studies of the life histories of the *Gortynas*.

Mr. G. Chagnon has made a specialty of the *Buprestidæ* and *Cerambycidæ* of the world, and has built up a collection of these insects which is well worth seeing. At the same time he has not neglected the local fauna of Coleoptera, besides which he has commenced a collection of local *Lepidoptera*, taking particular interest in the *Geometridæ*, in which group we hope to see him have a companion in Mr. G. A. Southee, who has recently become an enthusiastic collector.

It is a pleasure to record the interest that is being aroused among the younger folk, not only in making collections but also in the economic value and the life histories of the specimens they capture. Special mention may be made of the steady work of Masters G. R. Southee, Arthur Denny, T. S. Robinson, H. G. Roche, and Roland Desjardins.

I myself have little to record, owing to my having been severely handicapped by the loss in the spring of my helpmate. However, I have added to my list of local *Blattidæ* several specimens and have been making a special study of ecological entomology, and hope to give my observations at an early date. I may mention, in reference to this subject, that *Sporotrichum globuliferum*, Speg., has been quite epidemic in this locality, and that *flacherie* has dealt great destruction among the caterpillars of *Malocosoma Americana*, Harr.

The following interesting captures may be mentioned:—

Erora laeta, Edw., St. Hilaire, Que., 24th May. E. C. Barwick.

Enodia portlandia, Fab., Mt. Johnson, Que., 10th June. Charles Stevenson. (Fig. 16.)

Apantesis vittata, Mt. Johnson, Que., 10th June. E. Denny. (From which he obtained a batch of eggs, which he successfully brought through to maturity and obtained a splendid series of varieties. He succeeded in mating some of the imagoes and got more eggs, which are now full-grown caterpillars.)

Calosoma scrutator, Fab., St. John's, Que., 30th July. G. Chagnon. (Fig. 17.)

Hydræna pennsylvanica, Kies, St. Anne de Bellevue, Que., 23rd July. G. Chagnon.

Haltica rufa, Ill., St. Hilaire, Que., 27th June. G. Chagnon.

A report of the entomological work of this locality would be incomplete without making an acknowledgment of the lady friends of the collectors, especially Mrs. E. Denny and Mrs. G. R. Southee, for their assistance and encouragement of the insect-hunting hobby.

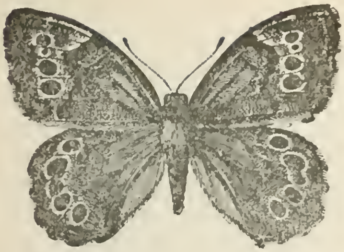

Fig. 16. Enodia Portlandia, the Pearly-eye butterfly.

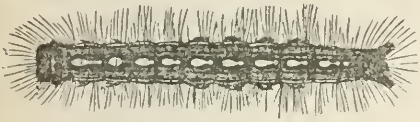

Fig. 18. Forest Tent-caterpillar.

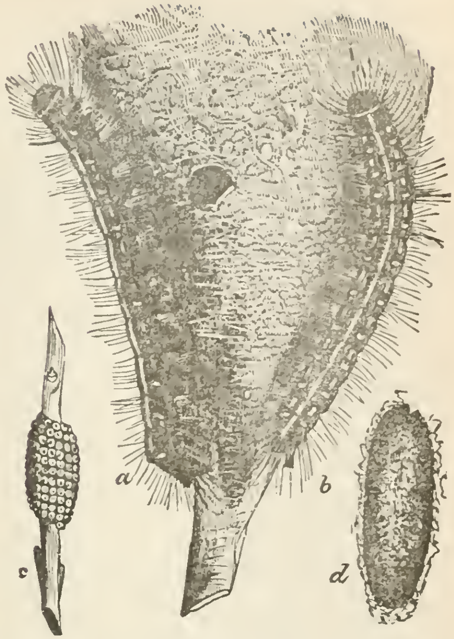

Fig. 19. Orchard Tent-caterpillars on their web : *c* egg-bracelet ; *d* cocoon.

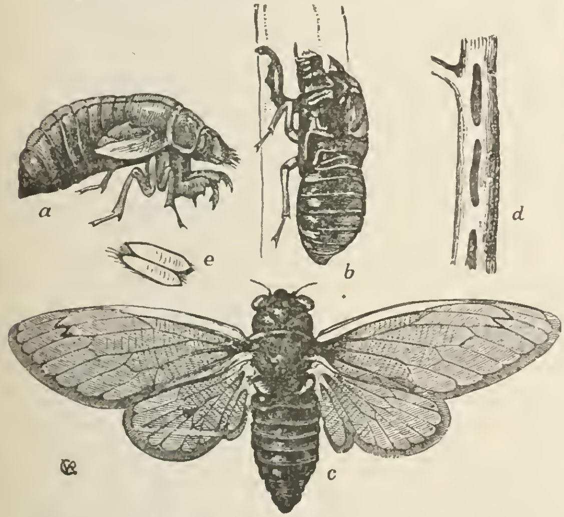

Fig. 22. Cicada : *a* pupa, *b* empty shell, *e* eggs. *d* slits made in twig for eggs, *c* mature Cicada.

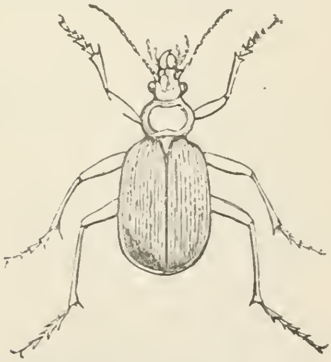

Fig. 17. Calosoma scrutator, the Green Caterpillar-hunter beetle.

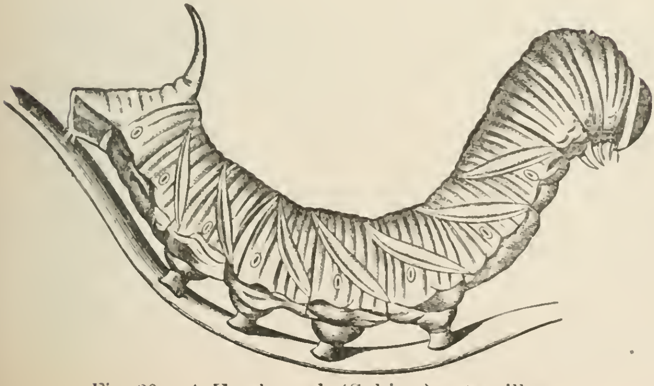

Fig. 20. A Hawk-moth (Sphinx) caterpillar.

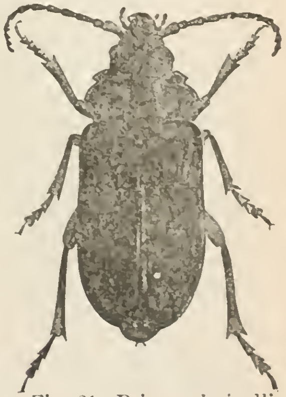

Fig. 21. Prionus laticollis beetle.

FOREST INSECTS.

By Rev. Thomas W. Fyles, D.C.L., F.L.S., Levis, Que.

Insects fall naturally under two heads.—biting insects, Mandibulata, and sucking insects, Haustellata. To the former belong the borers in the tree-trunks, the twig-girdlers, and the leaf devourers; to the latter, the Cicadas, the scale insects, and the plant lice. It is difficult to tell which of the two orders is the most hurtful to vegetation. In "God's great army" the most insignificant corps becomes occasionally by force of numbers, a formidable array.

In the summer of 1881, the maples presented a strange appearance. Their foliage became brown and withered, as if autumn had come before its time. On examination it was found that countless multitudes of the larvæ of a minute species of moth, *Depressaria acerifoliella,* had assailed the foliage.

The larva of this species bites disks from the leaves and binds them together with a silken filament, so constructing a case for itself. It protrudes its head and forelegs from its case and moves about the leaf, eating away the fleshy parts.

In 1893 another remarkable insect attack upon the maples was witnessed: nearly every leaf of the trees was drawn out of shape—its edges being fastened together with a fine web. Within the tent thus formed was a curious brown case, somewhat in the form of a cornucopia, and snugly ensconsed within the case was a green larva with an amber-colored head. This truly was one of the most economical of insects. Longfellow has said:—

> "O thou sculptor, painter, poet!
> Take this lesson to thy heart:
> That is best which lieth nearest,
> Shape from it thy work of art."

And this larva had used up its exuviae and excrement in forming a case for itself—an inner retreat. The leaf was its shelter and store of food; for it fed upon the parenchyma, and left only the veins and skin. The case was its stronghold. The name of the insect is *Semasia signatana.*

Our native insect pests are bad enough; but the insect foes that we most dread are the foreigners, for the reason that "it is better to deal with the devil you know than the devil you don't know."

The advent of the Larch Saw-fly (*Nematus Erichsonii*) is an old story now. This pest destroyed our tamaracs in the eighties, and it

> "Still goes marching on."

Mr. A. H. D. Ross, in his excellent article on "The Forest Resources of Labrador Peninsula," tells us that of late years the European Larch Saw-fly has destroyed most of the larch between Lake St. John and Lake Mistassini, and the pest is spreading northward.

The Gypsy moth, the Brown-tail moth, and the Leopard moth are new importations to the country to the south of us.

So great a plague has the Gypsy moth been in Massachusetts that the Legislature in four years (1890-4) expended $275,000 in the effort to exterminate it, and had not succeeded: and further appropriations were required.

The larva of the Brown-tail moth is also injurious in Massachusetts, and as their fine barbed hairs are easily detached and carried in the air, they often settle upon the passers-by, work their way into the pores of the skin and cause much suffering. They are greatly to be dreaded.

The larvæ of the Leopard moth are borers. The species has found its way to New York.

In Canada a very common and mischievous pest is the Forest-tree tent caterpillar (*Clisiocampa disstria*). This also flourishes more abundantly some years than others. In 1899 it and its congener, *Clisiocampa Americana*, were so abundant in the Counties of Drummond and Shefford that they stripped the second growth trees bare. Hordes of them crossing the railway brought the train to a standstill, the rails having become slippery with crushed larvæ.

The larva of *C. disstria* (the Forest tent caterpillar) can readily be distinguished from that of *C. Americana* (the Orchard Tent caterpillar). It has a blue head, and a row of silvery spots down the back (Fig. 18), while the other has a black head and a continuous dorsal line (Fig. 19). I consider *C. disstria* the worst of the leaf-eating foes of our hardwood trees.

The larvæ of *Orgyia antiqua* and *Orgyia leucostigma* are handsome but mischievous. They are beautifully tufted along the back. (Fig. 4.) Those of the latter species may be known by their red heads. Both kinds feed upon a variety of forest trees.

The males of these species are called "Vapourers" because of their jaunty flight. They skip hither and thither, as Wood says, "like Cœlebs in search of a wife." The females, on the other hand, are most exemplary in their behaviour. St. Paul, if he had been an entomologist, would have admired them greatly—they "go not from house to house," they stay at home and mind their own affairs. They remain upon the cocoons, from which they crept. There they await their mates; there they lay their eggs; and there they die. But we must not give them too much credit for their domestic virtues. They are aided by the force of circumstances in conducting themselves well—they have only rudimentary wings. (Fig. 7.)

There are a number of large moths, the larvæ of which under peculiar circumstances might become injurious to forest trees. Their very size makes them formidable. (Fig. 20.) The larvæ of the Hawk-moths, *Sphinx chersis* and *Sphinx kalmiæ*, feed upon the ash, though I frequently find them on the lilac. This is not surprising, for both the lilac and the ash belong to the same family of plants, the Oleaceæ, of which the olive tree is the type.

The larva of *Ellema coniferarum* feeds upon the pine. I wish the species were a little more common, for I have only met with one specimen in many years.

The larvæ of *Ceratomia amyntor* feed upon the elm. They have four prominent horns on their shoulders; and Harris on this account gave them the name of *Quadricornis*. There are peculiarities in the form and habits of this species that are well worth notice.

It will be remembered that the leaves of the elm on the under side are strongly and regularly ribbed, and that they are often curled over on one side in a roll. The Amyntor caterpillars are of the same color as the leaf, and along the sides have seven oblique, raised, rough lines. They lie extended along the edge of the leaf, and in that position very closely resemble the roll of the leaves near them. Nor is this all. In the autumn the leaves of the elm become rusty brown in colour, and that the resemblance to the leaves may be maintained, the caterpillars become of the same hue. They afford in this a rmarkable instance of what is called Mimetic Analogy.

The larva of that stately moth, *Triptogon modesta*, feeds upon the poplar, and that of *Cressonia juglandis* upon the black walnut, the butternut and the hickory.

Upon a variety of forest trees, the larvæ of those magnificent Saturnians, *Attacus cecropia* (the largest of our moths), and *Telea polyphemus* are to be found, whilst those of *Actias luna* (the most beautiful) feed upon the butternut, and those of *Hyperchiria Io* upon the elm, the basswood and the balsam-poplar. The last-named larvæ are set with stinging spines.

In the West the larva of that splendid moth, *Eacles imperialis,* feeds upon the white pine; and the larvæ of *Citheronia regalis,* which has as many horns as the Beast in the Apocalypse, and is locally known as the "Hickory Horned Devil," feeds upon the black walnut, butternut, hickory, etc. I have never heard, however, that the caterpillars of these very large insects have done much damage.

Of insects that injure the roots of the trees, these are remarkable:—

The White Grub: This is the larva of the May Beetle, *Lachnosterna fusca.* (Fig. 6.) The grubs of this species are very general feeders upon the roots of plants. They are said to be injurious to young pines and tamaracs.

A formidable foe to the poplar, basswood and oak, is *Prionus laticollis,* the Broad-necked Sawyer which bores into the roots of trees. As it works underground its ravages are not easily detected. (Fig. 21.)

But of the underground insect foes of the forest trees, the Cicadas are, I think, the worst. Happily this part of Canada is out of the range of *Tibicen Septendecim,* which spends seventeen years at the roots of trees, imbibing at the very founts of vegetable life. But *Cicada canicularis* is very abundant with us. If you go into the woods in autumn you will hear the shrill sound produced by their little tambours or side drums, which vibrate, as the boys say, "for all they are worth." We have another species, *Tibicen rimosa,* but it is not common with us.

The habits of the Cicadas are interesting. The females cut grooves in the twigs of their favorite trees, and in each groove lay a row of eggs. The eggs seem to be nourished by the sap in the twigs, for they become enlarged. The newly-hatched larvæ drop to the ground and burrow till they reach the roots of the trees. Into these they drive their beaks, and then, for three years, live by suction upon the sap. At the end of that time they work their way out of the earth, climb for a short distance up the trees, and then writhe and twist till their skins burst down the back. Out of the rent, in every case, creeps a perfect insect, drawing its legs out of their former enclosures as out of boots. In about ten minutes (I have watched the process) the air has penetrated to every part of the insect's body, its wings have been shaken out of plait into their full dimensions, and the creature is ready for flight. (Fig. 21.)

If you ask me what should be done to check the Cicadas, well, I know what I should do as regards the orchard, the sugar-bush and the enclosed woods. I should in the autumn turn a herd of swine into them. The animals would not only eat the windfall apples, the acorns and beech-mast and fungi, they would grub about the roots of the trees, and devour the immature Cicadas, the White Grubs, and the pupæ of many kinds of flies, beetles and moths. I have seen the experiment tried, and the pigs throve.

But a part of my subject of more interest to lumbermen is that relating to the "Borers"—and truly their name is legion.

A number of beetles belonging to the family Buprestidæ bore in the pine. Two splendid beetles of this family are *Chalcophora Virginiensis* and *Chalcophora fortis.*

C. fortis is the largest and handsomest of our Buprestidæ, and, perhaps, as regards our collections, the rarest. Mr. H. Hague Harrington speaks of it as rare at Ottawa, and I never met with it at Montreal, nor in the Eastern Townships; but one day I was walking under the cliff, at Hadlow, on the south side of the river, when I found specimens of both *C. Virginiensis* and *C. fortis.* There were no trees near in which they could have bred, and the insects were fresh and perfect. The discovery was a marvel to me till, on looking to the river side, I saw, stranded, a crib of pine timber; and then the mystery was solved. This incident shows how easily insects may be spread over the country.

There is a beetle called *Monohammus titillator.* (Fig. 23.) This beetle and its congener, *Monohammus scutellatus* (Fig. 24) make damaging tunnels in the trunks of the pine; and they sometimes turn up unexpectedly in places far from their native forest.

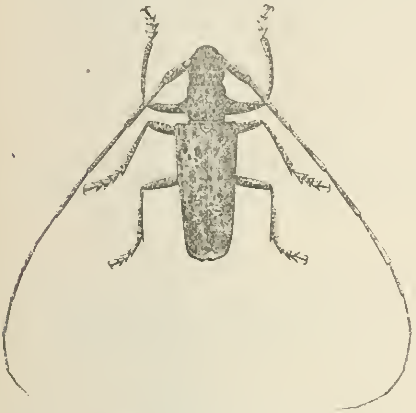

Fig. 23. Monohamus titillator, Pine-borer beetle.

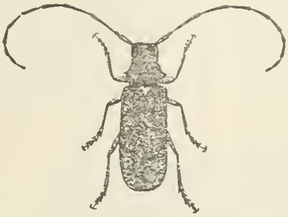

Fig. 24. Monohammus scutellatus.

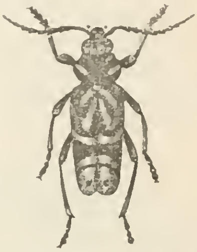

Fig. 25. Plagionotus speciosus, Maple-tree borer.

The larva of *Plagionotus speciosus* (Fig. 25) is a borer in the maple. That of the fine beetle *Saperda calcarata* bores in the poplar. The Apple-tree borer, *Saperda candida* (Fig 26) works also in the American mountain ash and the thorn. The larvæ of *Saperda vestita, Saperda tridentata* and *Cyllene pictus* bore respectively in the basswood, the elm and the cedar (*Thuja occidentalis*).

Time would fail me to enumerate the small beetles which mine between the bark and the white wood, and which at times do much harm—volumes might be written upon them.

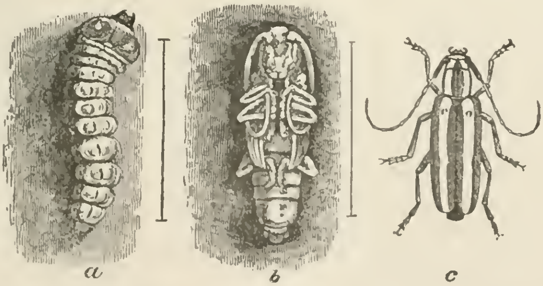

Fig. 26. Saperda candida, Apple-tree borer: *a* grub, *b* pupa, *c* beetle.

But I must not pass over the more important of the Lepidopterous and Hymenopterous borers. Of the former we have remarkable instances; in *Cossus Centerensis*, which bores in the poplar (Fig. 27); in *Prionoxystus robiniæ*, which, as its name implies, bores in the locust, or false acacia; and in *Prionoxystus Macmurtrei*, which Mr. A. F. Winn has found upon oaks on Mount Royal.

The larva of several species of Clear-wing moths are borers; *Sesia acerni* in the soft maple, *Sesia pictipes* in the wild cherry, *Pseudohazis denudata* in the ash.

The Horn-tail, *Tremex columba,* or Pigeon Tremex (Fig 28), is a creature of formidable appearance. It has a stout acuform, but hollow, ovipositor which extends in its sheath from the middle of the underside of the abdomen to a length of half an inch beyond the body. The Tremex drives this instrument through the bark and into the soft wood of the tree (which is usually a maple or a beech), and then, by muscular action, it passes its eggs through the ovipositor to the end of the wound it has made. The Tremex is, in many instances, so exhausted in the process that it has not strength to withdraw its ovipositor, and perishes at its post.

As soon as the young larvæ are hatched they begin to tunnel in different directions, enlarging their passages as they grow.

Other Horn-tails of like habits to the Tremex are *Sirex albicornis, Sirex flavicornis,* and *Paururus cyaneus,* and these assail the pine.

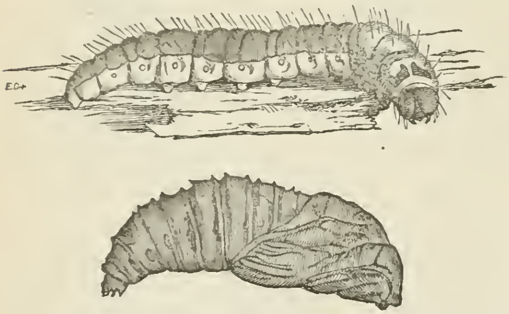

Fig. 27. Wood-boring caterpillar (Cossus) and chrysalis.

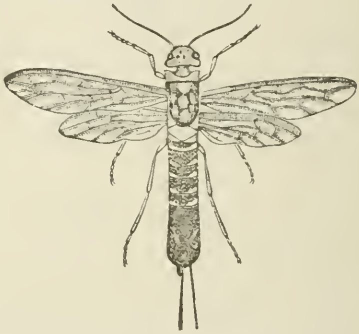

Fig. 28. Pigeon Tremex — the Horn-tail borer.

It must not be supposed that nature has left these borers to multiply and work their will without a check. If she had, the forests would have disappeared long ago. No—a number of formidable Ichneumon flies, with yet longer ovipositors, are engaged in reducing the hosts of the enemies.

Indeed every kind of destructive insect has its foes. Insectivorous birds and predaceous insects, under ordinary circumstances, keep the spoilers within bounds. And man may give his assistance to nature to the same end. For instance, he can preserve the woodpeckers and the soft-billed birds. The man who would shoot a woodpecker ought to be ostracized. I wish I could hear more frequently the hearty laughing call of that noble bird the Bonneted Woodpecker, *Picus pileus.* Alas, its beauty has been to it a "fatal gift." It has drawn the attention of the fowler.

There should be a law forbidding juveniles to carry guns. There is this to be said, these gun-bearing boys lessen their own numbers. Many a young rascal will go into the woods and think he has done a clever thing if he has brought down a Wakeup or a Tom-tit.

When a tree is found with Horn-tails affixed in the position I have mentioned, it may be known that that tree is doomed; it should be felled and split up for stove-wood.

The proper and timely burning of brush-piles will do much to lessen the numbers of insects. Brush should be burned, not when the ground is covered with dry herbage and dead leaves, but when vegetation is lush and green, and then the fire and smoke would destroy their thousands of insect pests.

In Europe in former days foresters were men of standing and importance. It seems to me that it would be a good thing if our Government would appoint in every county in which lumbering operations are being carried on and settlements made, Government foresters, intelligent men of high character, allowing them such assistance as might be required. Their duties should be to preserve the game, destroy the wolves, regulate the burning of the debris of the lumber camps and clearings, see to the due observance of forest laws, and generally to conserve woodland interests.

I think that such officers would have many important duties to perform and that their life would be full of interest and attraction.

THE ADVANTAGES AND DISADVANTAGES OF THE CANADIAN ENTOMOLOGIST.

REV. THOMAS W. FYLES, D.C.L., F.L.S., LEVIS, QUEBEC.

The youthful entomologist in England, in the forties and fifties of last century, was a privileged person—he enjoyed many advantages. Kirby and Spence were both living in the earlier half of the period mentioned. Kirby died on the 4th of July, 1850. In 1856 Spence brought out a cheap edition of the "Introduction to Entomology," and, in four years, 10,000 copies of the work were sold. This work did more than any other to popularize the study of entomology.

Those were the days of Newman, Stainton, Waterhouse, Douglas, Westwood, Morris, Wollaston, Wilkinson, and other lights. Van Voorst was publishing works on Natural History. Newman was carrying on the "Zoologist," and Stainton the "Weekly Intelligencer." There was an abundance of cheap yet valuable literature for the rising entomologist.

The comparatively small extent of the British Islands brought the number of species—say of the *Lepidoptera*—within the mental grasp of the diligent student. How different is it with us now, on this vast continent of North America! A crown-octavo volume of 723 pages is now required, for a mere list of the Lepidoptera with its index.

England in those days was a very paradise for entomologists. The plantations and hazel-copses for the preservation of the game, the open woods of—

> . . . . "tall ancestral trees
> O'er all the pleasant land,"

the withy-gores, the fens, the moors were all famous hunting-grounds.

It was a privilege to take part in an "outing" at some appointed place. To wander along the forest paths alive with Marbled Whites and Silver-washed Fritillaries, till the waving nets shewed the spot where the Entomologists were gathered together. The excitement of the chase, the refection in the shade of the trees, the pleasant conversation, the comparison of captures, were things to be remembered. So were the multitudinous voices of the birds that made the woodland ring. England is rich in song-birds; and linnets, goldfinches, bulfinches, yellowhammers, black-caps, white-throats, robins, blackbirds, thrushes, and others, seemed to greet the woodland visitors in one full tide of song.

I remember an effusion that I sent to the "Weekly Intelligencer," after such an outing. It ran:—

"Come to the wild woods, come away,
Now the sun is bright in the month of May,
And the mated birds, in boist'rous glee,
Fill the wide heavens with harmony;
Now the breezes shake the hyacinth bells,
And the pale anemone whitens the dells,
And young leaves whisper soothingly,
And all is joy and light and love—
For the azure heaven is smiling above,
And the green earth laughs for sympathy.
Come where the Hair-streak* flutters by
Like a living leaf; where the butterfly†
Whose snowy wings are dash'd with green,
And with rich orange tipp'd, is seen;
Where the Chequer'd Skipper,‡ as you tread,
Springs lightly from his grassy bed;
And Clouded-border Moths§ unfold
Their tender wings of speckled gold;
Where *Fuciformis* quivers round
The stems with honeysuckle bound;
And, like a fragment from the sky,
Sweet *Alexis* gambols by;
Where *Falcula*, whose hooked wings
Have eye-like spots, to the birch leaf clings;
While near it, where the catkins play,
Papilionaria larvæ stray,
Mid forms like their own safe to be
From prowling *Ichneumonidæ*,
From the busy tit that twitters near,
And other foes they have to fear.
Oh, come to the wild woods, come away,
Now the sun is bright, in the month of May!
Come, for a thousand sights shall cheer
Your eye—a thousand sounds your ear!"

In Canada the brethren of the net are too widely scattered, the claims of business are too urgent, the mosquitoes too troublesome for such gatherings to be very frequent, very numerously attended, or very thoroughly enjoyable.

But, notwithstanding, the sugar-woods, the intervales, the neglected bottom lands of this country, the orchards, where the owners are better farmers than fruit growers, are all fine hunting-grounds.

On the 16th of August I discovered an undrained hollow in which was a thick growth of dwarf willows, sedges and flags. It was richly bordered with asters, Joe Pye Weed and Golden Rod, in full bloom. The multitude of insects clustering about the flower heads was truly astonishing. The Painted Ladies were much in evidence. *Pamphila Manitoba* was there; and there was a great show of Humble-bees, wasps, ichneumons, dragonflies, flower-flies, etc. I spent a very profitable hour amongst them.

Bombyces were scarce in the collections of former days. We have an advantage now that was undreamed of when I was a boy, viz., the electric light. Many of the gems of our collections have been taken at this light. So late as the beginning of this month (October, 1905), I was passing by a warehouse on the Louise embankment late at night, when I saw, under an arc-light, a fine specimen of *Lophodonta ferruginea*, Pack, and one of *Charadra deridens*, Gn. I had no cyanide bottle, nor chip boxes, with me;

**Thecla rubi.*
†Anthocharis cardamines.
‡Thymele alveolus.
§Venilia maculata.

but the specimens were near together; and I swept them into my hat, and clapt it quickly upon my head. They were fidgety for a while, but soon quieted down and went to sleep; and on reaching home I transferred them to the cyanide-bottle.

Speaking of the cyanide-bottle: how great an improvement its use is to the old method of killing insects. Many a man, in the days I have spoken of, fixed a sheet of cork in the crown of his hat, and a supply of pins in the lapels of his coat; nipped his captures smartly under the wings with the tips of his thumb and fore-finger; pinned them ready for setting, and then stowed them away in his hat.

My own plan was to carry a small vial of chloroform and a few pieces of twine about two inches long in my vest pocket, and a few nests of chip-boxes in a special pocket of my coat. When I had boxed a specimen I slipped in one of the pieces of twine wet with the chloroform, to send it to sleep; and when I reached home I gave it its final quietus by piercing it under the wings with a steel pen dipped in a solution of oxalic acid. I found this a good plan, and I often make use of it still.

Before the cyanide-bottle was fairly established, men tried various expedients,—bruised laurel-leaves, formic acid, etc. One entomologist advocated, in doggerel verse, a new agent:—

"An agent nothing can surpass,
Will insects instant kill,
For preservation, too, as well,
This wondrous agent let me tell,—
Five drops, or ten, of nothing but
Essential oil of cajeput."
W. H.

There are many advantages now open to the Canadian entomologist, for which he may consider himself highly favored. There is the great advantage of having so able and obliging a scientist as Dr. James Fletcher of the Department of Agriculture, to consult in his difficulties—one from whom he may feel sure of receiving a courteous reply to his enquiries, and valuable information.

Again, the privilege is open to him of membership in the Entomological Society of Ontario, either directly with the parent stem, or through one of its branches. And in this connection, I congratulate Professor Sherman and the members of the newly-formed Branch in Guelph. One of the helps they will receive in their studies will be the receipt monthly of the *Canadian Entomologist,* a publication in which Dr. Charles J. S. Bethune has built, and is still building—and long may he continue to build— a monument that will preserve his name as long as entomologists shall be found in Canada—which I trust will be till the end of time.

The annual meetings of the Society present opportunities to be highly prized. "Like as iron sharpeneth iron, so doth the countenance of a man his friend;" and we cannot attend the meetings of this Society without feeling encouraged and stimulated.

A meeting that will be remembered with special pleasure is this present gathering. The noble institution in which we are assembled, and its beautiful surroundings; the kindness of Principal Creelman and the members of his staff; the presence with us of Professor J. B. Smith; his wonderful description of the mosquito and its habits, so beautifully illustrated, will all afford us delightful reflections.

Who amongst us has not known Professor Smith by his works? It is good, now, to look upon his face, and listen to his voice, and feel the warm grasp of his hand.

I made the acquaintance of the mosquito years ago, off Anticosti. I saw the little brute alight upon my hand, and I watched it swell and change color from grey to crimson, with some amusement; but the results taught me that such pleasures could not be indulged in with impunity. Nevertheless, as I listened to Professor Smith last night, I almost longed to be wading knee-deep in those delightful swamps he showed us, and assisting those worthy fellows who were bagging the peddlers of malaria and yellow fever.

Lastly, what advantages the modern student has in the number of admirable works, upon every branch of entomology, that have appeared of late years. Among them are Harris's Insects Injurious to Vegetation, Packard's Guide, Saunders' Insects Injurious to Fruits, Smith's Insects of New Jersey, Ashmead's Proctotrypidæ, Holland's Butterfly and Moth Books, Howard's Insect Book, Edwards' and Scudder's respective works, the valuable series of Bulletins issued from Washington, Albany, and other points of observation, not omitting Ottawa.

May the Entomological Society of Ontario flourish! May its new Branch, the Guelph Branch, bourgeon, and blossom, and bring forth fruit to the benefit of the general community, and for many a day!

ORTHOPTERA AND ODONATA FROM ALGONQUIN PARK, ONT.

By E. M. Walker, B.A., M.B., Toronto.

The following list of Orthoptera and Odonata is based chiefly upon collections made by the writer during two canoe trips in Algonquin Park, and the vicinity of Dwight, a few miles to the south-west of the Park limits. The first trip was made during the second and third weeks of August, 1902, while the second occupied the latter half of the same month in 1903. To the list of Odonata are added the names of a number of species taken by Prof. John Macoun in July, 1900, and also those of many specimens, especially nymph exuviæ, collected by Mr. Paul Hahn during August, 1904.

I wish to express my thanks to Prof. J. G. Needham for his kindness in determining some of the more difficult species of Odonata.

As August is rather late for most Dragonflies, although it is the height of the season for Orthoptera, the list of the former is by no means a representative one, but will give some idea of the dragonfly fauna of the region. It probably contains less than two-thirds of the number of species native to the district, whereas the list of Orthoptera doubtless includes more than three-fourths of the total number of species to be found there.

The country traversed is an ideal one for dragonflies, abounding in lakes and streams, which vary in their course from the most placid weed-grown reaches to the swiftest rapid. The north branch of the Muskoka River, which was our chief highway in both trips, is a very characteristic stream. In some parts of its course its surface is perfectly smooth for miles at a stretch, the shore low and fringed with alders, with a background of luxuriant balsams and spruce; in the other parts there are rocky, turbulent rapids, and the banks are much higher with a much more varied vegetation. In other places, again, the rapids are smoother and shallower, with gravelly bottoms, and there are steep sandbanks on either side. Each kind of locality has its peculiar species of dragonflies, more species apparently being found about the gentle rapids than elsewhere.

Algonquin Park, which covers an area of about 1,600 square miles just north of the Muskoka District, lies at the extreme northern limits of the Transition life zone as it passes into the Boreal zone. Many forms of plant and animal life found within its limits do not belong to the Boreal zone in a restricted sense, but on the whole the flora and fauna are of a Boreal type. In the partly cleared and cultivated country in the vicinity of Dwight, lying to the south-west of the Park limits, several species of insects belonging to the Transition and Austral zones were met with, which did not appear within the Park limits. Among these are the following Orthoptera:

Spharagemon Bolli, Scudd. A single male of average size was taken at Dwight. This locust belongs to the Austral and warmer parts of the Transition zones, and becomes smaller in the northern part of its range. It is abundant and of large size in the Austral strip along Lake Erie, but becomes smaller and scarcer at Sarnia and Toronto, north of which I have never before taken it, except a single female from Peterboro' County.

Mecostethus lineatus, Scudd. This species was found among the sedge bordering a small lake in a brulé near Dwight. It belongs to the Transition and northern parts of the Upper Austral zones, and is replaced in the Boreal by its ally, *M. gracilis*, Scudd., whose range in Ontario overlaps that of *lineatus* considerably, as it extends southward to the watershed between Lake Simcoe and Lake Ontario. *M. gracilis* was not found in the Park, but doubtless occurs there.

Orchelimum vulgare, Harr. This grasshopper was found in small numbers in the fields about Dwight, but did not appear in the Park, nor could I find it at North Bay, Lake Nipissing, in September, 1900, although the proper surroundings apart from the northern latitude were apparently often met with. This species and *Conocephalus ensiger*, Harr., are enumerated by Scudder among the Alpine Orthoptera of the White Mountains (Appalachia, VIII., No. IV., p. 19). Their range seems to stop short of the Boreal zone in Ontario and I found the same to be true in Quebec.

Scudderia furcata, Brunn. A single male was taken near Dwight. It ranges at least as far north as Lake Nipissing, but I doubt its being a truly Boreal form. It is much commoner southwards.

Except the above species, all of which were taken near Dwight, outside the Park limits, and possibly another (*Nemobius palustris*, Bl.), whose range is not yet well enough known, all the Orthoptera in the list are inhabitants of the Boreal zone. *N. palustris* has elsewhere been taken only in the peat bogs of Northern Indiana, where several northern Orthoptera occur.

Of the Odonata, the comparatively large number of Cordulinæ, despite the fact that their season was practically over, testifies to the Boreal character of the dragonfly fauna. Most of these Cordulinæ are represented by nymphal exuviæ only. But one dragonfly, *Celithemis elisa*, Hagen, taken near Dwight, did not appear within the Park limits. I have never before seen it so far north. It is fairly common in the Austral and lower part of the Transition zones in Ontario.

The absence of *Libellulæ* I do not regard as significant of anything but the rather late season in which most of the collecting was done, and the character of the bodies of water met with.

ORTHOPTERA.

Acridiidæ.—

1. *Tettix granulatus* (Kirby). Common in damp places in woods.

2. *Tettix acadicus* (Scudd.). Several specimens of what seems to be this species were taken beside a lumber road through a hardwood forest, August 20, 1902.

3. *Tettix Handcocki*, Morse. A number of long-winged examples taken from a patch of wild strawberry, lichens and short grass growing on sandy soil in a bushy field, September 2, 1902.

4. *Tettigidea parvipennis* (Harr.). Immature specimens were found on low marshy parts of the river shore.

5. *Chlœaltis conspersa*, Harr. Common in the drier parts of open woods.

6. *Stenobothrus curtipennis* (Harr.). Very abundant in low places wherever long grass occurred.

7. *Mecostethus lineatus* (Scudd.). A few were found flying about the sedge bordering a small lake near Dwight, August 23, 1903.

8. *Chortophaga viridifasciata* (De Geer). Young nymphs were found on the grassy hillsides near Dwight.

9. *Camnula pellucida* (Scudd.). Common everywhere in dry, open places in the woods and in clearings

10. *Dissosteira carolina* (L.). Common about Dwight and occasionally seen in clearings in the Park.

11. *Spharagemon Bolli*, Scudd. One male from a dry, grassy hillside at Dwight, August 23, 1903.

12. *Circotettix verruculatus* (Kirby). Common in clearings in the Park and on sandy beach at Dwight.

13. *Podisma glacialis Canadensis* (Scudd.) Walk. A common and very characteristic species, found on bushes in open woods. The specimens are smaller than those taken at North Bay on September 12, 1900, and approach the race *variegata* more closely.

14. *Melanoplus Bruneri*, Scudd. This species was found in considerable numbers in two or three limited areas near Dwight. They were found on patches of short grass and strawberries on sandy soil. September 2, 1902, one male. August 10, 1903, many specimens.

This is a western form, occurring with two or three closely allied species in the Boreal zone of the Rocky Mountain region from Alberta to New Mexico.

In my List of Ontario Acridiidæ I determined it somewhat doubtfully as *Bruneri* from a single male, but in 1903 a number of specimens were taken and I have since been able to compare them with Scudder's types of *Bruneri*. In these the pronotum is slightly narrower and more elongate than in the majority of my specimens, but the distinction does not hold good throughout the series and there seem to be no other characters of sufficient importance to justify the creation of a new species for my specimens. They are considerably larger than the few in the Scudder collection except one male from New Mexico.

M. Bruneri is probably a Boreal form extending across the plains or to the north of them.

15. *Melanoplus atlanis* (Riley). Abundant in the open sandy country about Dwight, and generally common in clearings.

16. *Melanoplus islandicus*, Bl. Common in paths and openings in woods everywhere. A very characteristic sylvan species often associated with *P. glacialis canadensis*.

17. *Melanoplus fasciatus* (Walk.). A few were taken in open woods at Whisky Falls, North River, and it was occasionally met with elsewhere, but not commonly.

18. *Melanoplus femur-rubrum* (De G.). Common in open, grassy clearings and in open marshes.

19. *Melanoplus luridus* (Dodge). Abundant on dry hillsides and scrubby fields, on sandy soil near Dwight, and occasionally seen in clearings in the Park.

There seems to be no doubt that *M. collinus*, Scudd, and *luridus* are synonymous.

20. *Melanoplus bivittatus femoratus* (Burm.). Common everywhere in rank grass in low places.

Locustidæ.—

21. *Scudderia furcata*, Brunn. Dwight, August 23, 1903, one male.

22. *Scudderia pistillata*, Brunn. Common on bushes in open woods in the Park. Our most characteristically Boreal Locustid.

23. *Orchelimum vulgare*, Harr. A single male was taken and a few others heard shrilling in clumps of tall grass in fields about Dwight.

24. *Xiphidium fasciatum* (De G.). Very common in open, grassy places everywhere.

25. *Xiphidium brevipenne*, Scudd. In rank grassy places, not very common. None were found at North Bay.

26. *Ceuthophilus pallidipes*, Walk. A great deal of careful searching was done for *Ceuthophili*, but not a single individual was found during the first canoe trip. On August 20, 1903, however, a nearly full-grown male of this species was found under a rotten log at Ragged Lake. A few very young *Ceuthophili* were also observed beneath stones beside a lumber road.

Gryllidæ.—

27. *Gryllus pennsylvanicus*, Burm. This species occurred sparingly throughout the Park.

28. *Gryllus abbreviatus*, Serv. Small-sized specimens were common in the fields about Dwight. I am still doubtful about the separation of these small northern individuals from *pennsylvanicus*, but they seem to pass through every gradation into the typical large *abbreviatus* of the Austral zone.

29. *Nemobius fasciatus* (De G.). Common everywhere in open grassy places. The small black variety, *abortivus* Caudell, was often met with in the Park.

30. *Nemobius augusticollis*, Walk. This species, by an oversight, was not collected, but its shrilling, which is easily recognizable when once known, was often heard along the banks of the North River. Unless abundant, it is very difficult to find. It is a common northern species.

31. *Nemobius palustris*, Bl. On August 18, 1903, I found this little cricket in considerable numbers in a floating sphagnum bog at the mouth of a creek flowing into Ragged Lake. (See Can. Ent. XXVI., 1904, 185.) It was the only Orthopterous insect found in the bog, except a few *Melanoplus femur-rubrum* in the more solid parts.

32. *Œcanthus fasciatus*, Fitch. Common on bushes and tall herbaceous plants in open places.

ODONATA.

Zygoptera.—

Calopterygidæ.—

1. *Calopteryx maculata* (Beauv.). Common on the river, flying along the shore amid the luxuriant vegetation.

2. *Calopteryx aequabilis*, Say. In 1902 I saw four or five of this species along the river, but captured only one, a male. In 1903 nine were seen. Among Prof. Macoun's specimens there are two fresh males dated July 6th and 25th, 1900. They are probably much commoner at that season.

Agrionidæ.—

3. *Lestes congener*, Hagen. Common in open woods and marshes.

4. *Lestes uncata*, Kirby. A single male from the North River, dated August 13, 1903.

5. *Lestes forcipata*, Rambur. Two males from the North River, August 13, 14, 1903.

6. *Lestes rectangularis*, Say. Common in swamps and open woods. It was common in an open sphagnum bog at the mouth of a creek emptying into Ragged Lake. They were associated with *Ischnura verticalis* and teneral examples of *Sympetrum vicinum*.

7. *Argia putrida* (Hagen). A number of specimens were taken by Mr. Hahn from July 15th to 21st, 1903, and 1904. I have also a badly broken teneral specimen taken by Prof. Macoun, July 6, 1900.

8. *Argia violacea* (Hagen). A pair were taken at Smoke Lake, August 17, 1903.

9. *Enallagma Hageni* (Walsh). Very common in open marshes and flying over the river in the smooth parts.

10. *Enallagma ebrium* (Hagen). One male taken by Mr. Hahn.

11. *Enallagma exsulans* (Hagen). A pair from Little Joe Creek, taken *in coitu*, August 29, 1902. Another male taken by Mr. Hahn in 1903.

12. *Ischnura verticalis*, Say. Common in marshy places bordering lakes and streams.

Anisoptera.—

Æschnidæ.—

13. *Ophiogomphus rupinsulensis*, Walsh. This fine green species was quite common on the river, flying over the shallower rapids and frequently settling on the exposed pebbles.

14. *Hagenius brevistylus*, Selys. Four males, all somewhat worn, were captured along the river. Two were taken by Mr. Hahn with one sweep of the net while flying over the water, August 22, 1903. Another was taken while resting in a path in the woods close to the river, August 20, 1903. In addition to these two nymph exuviæ were found on the rocks on the shore of Oxtongue Lake, August 10, 1903.

15. *Lanthus albistylus* (Selys). This dainty little Gomphine was fairly numerous locally over rapids. They were difficult to approach and only one male was taken (August 10, 1903).

16. *Gomphus brevis*, Hagen. A worn female was captured on the river at Whisky Falls, August 20, 1903, and a few minutes afterwards a male, also worn, was taken at nearly the same spot. Two nymph skins were found on the logs of a timber slide at the upper end of Ragged Lake.

17. *Gomphus exilis*, Selys. This nymph skin was found on the timber slide at Ragged Lake. Several others were found by Mr. Hahn on a log hut at the edge of Smoke Lake.

18. *Gomphus Scudderi*, Selys. This striking species was common on certain parts of the river, usually where there was a considerable current, but where the water was fairly deep. It was not so often seen over the swift rapids. They were usually moving along slowly with swiftly vibrating wings, every now and then making a dash to another spot. They would

sometimes alight on the canoe. Only one female was taken, but quite a number of males.

19. *Gomphus plagiatus,* Selys. A nymphal skin was found on a muddy part of the river shore just below a rapid.

20. *Boyeria vinosa* (Say). This was the most abundant of all the larger dragonflies along the river, but was never seen away from the water. It was most common on the smoother parts and had the curious habit of following the canoe, sometimes hovering close to the gunwale. A few nymphal skins were found by Mr. Hahn.

21. *Æschna constricta,* Say. A male was taken on Little Joe Creek, August 29, 1902, a pair from the North River, August 14, 1903, and a few females at Dwight, August 23, 1903. Much less common than the next species.

22. *Æschna clepsydra,* Say. The commonest Æschna in this locality; plentiful in openings in the coniferous woods, frequently settling on the trunks and branches of the spruce trees and balsams. A female was taken while ovipositing. She was resting on the edge of the shore with the end of the abdomen immersed in the water among a few aquatic plants.

23. *Æschna verticalis,* Hagen. Associated with the preceding, but apparently less numerous. A number of Æschna exuviæ were found by Mr. Hahn, but it is not known to what species they belong.

Libellulidæ.—

24. *Macromia Illinoiensis,* Walsh. A nymphal skin was found by Mr. Hahn. The imagoes were occasionally seen patrolling the river, but would swoop past the canoe and disappear so quickly that it was quite useless to attempt their capture.

25. *Didymops transversa* (Say). A nymphal exuvia was found on the rocky shore of Oxtongue Lake, some yards from the water. Several others were found by Mr. Hahn along the river.

26. *Neurocordulia* (sp.). About a dozen exuviæ were found upon the side of a timber slide at the upper end of Ragged Lake, August 17, 1903. They were mostly from two to four feet from the ground, of which there was a narrow strip between the timber slide and the water. Another was found by Mr. Hahn at Canoe Lake.

Prof. Needham, to whom I sent one of the skins, says they do not belong to *N. obsoleta* (Say), the only species of *Neurocordulia* which has been bred, and may be *N. Yamaskanensis* (Pro.), which occurs in Quebec.

27. *Epicordulia princeps,* Hagen. A single nymphal exuvia was found by Mr. Hahn.

28. *Tetragoneuria semiaquea,* Burm. One male taken by Prof. Macoun, July 6, 1900. I found the exuviæ in considerable numbers on the timbers of a log hut at the lower end of Smoke Lake. The hut was built on the shore of a shallow bay connected with the main body of the lake by a rather narrow passage. The bay was full of pond-weed (*Brasenia peltata*), and other aquatic plants and was doubtless a fine breeding-ground for Odonata. Skins of *Helocordulia Uhleri* and *Gomphus exilis* were also found on the hut.

29. *Tetragoneuria cynosura* (Say). Skins of this species, according to the distinctions given by Prof. Needham, were also found.

30. *Tetragoneuria spinigera* (Selys). Two exuvia of this genus with the lateral spines of the ninth segment considerably more divergent than the others probably belong here.

31 *Helocordulia Uhleri* (Selys). Two exuviæ taken from the log hut on Smoke Lake and a number from Canoe Lake.

32. *Somatochlora elongata*, Scudd. Two males were taken, one at the marshy bay at the lower end of Smoke Lake, August 17, 1903, the other from a lumber road which runs through the woods close to the North River, August 20, 1903. Many others were seen flying over the river and in the woods, but they are almost hopeless to catch, as they fly very high.

33. *Somatochlora forcipata* (Scudd.). A male of this rare species was taken by Prof. Macoun, July 15, 1900.

34. *Cordulia Shurtleffi*, Scudd. A single nymphal skin was found by Mr. Hahn upon a boat-house on Canoe Lake, August 15, 1904.

35. *Celithemis elisa* (Hagen). A single fresh male was captured at Dwight by Mr. Hahn, August 23, 1903.

36. *Leucoshinia frigida* (Hagen). Two females, taken by Prof. Macoun at Catfish Lake, July 26, 1900.

37. *Sympetrum vicinum* (Hagen). Very common at Dwight on September 2, 1902, and in the cranberry bog at Ragged Lake. Also seen occasionally in other marshy places. Many of the specimens seen were tenerals.

38. *Sympetrum semicinctum* (Say). Four males and one female taken by Prof. Macoun, July 23 and 25, 1900. Three of these are labelled Catfish Lake. I found them quite numerous at one spot on the upper end of Ragged Lake near the timber slide (August 17, 1903). I also saw one on Little Joe Creek. They seem to be local.

39. *Sympetrum rubicundulum* (Say). Very abundant everywhere. A number were taken by Prof. Macoun in July.

40. *Sympetrum obtrusum* (Hagen). Very common everywhere. I took more examples of this species than the preceding, but in Prof. Macoun's series there are more of *rubicundulum*.

41. *Ladona Julia*, Uhler. A male was taken by Prof. Macoun, July 5, 1900.

BUTTERFLY COLLECTING IN CANADA, 1904.

By Mrs. Nicholl, Bridgend, South Wales.

I will not weary you with a long account of my last year's collection of butterflies, because the insects that I brought home do not represent, even tolerably, the Lepidoptera of British Columbia.

I hope to return there next summer and to collect in the south-west corner of the Province, and also, if possible, to explore the north-western part of Washington Territory at the head of Lake Chelan, including a part of the Cascade Range. I believe that the "dry belt" of British Columbia, sometimes known as the Rattlesnake Belt, comprising the district south of Lake Okanagan and Arrow Lake, is perhaps the extreme northern limit of many southern species—which would be met with in typical perfection south of the boundary line. Arriving at Montreal May 22nd, I went direct to Ottawa. Here I had the pleasure of making acquaintance with the well-known Canadian entomologist, Dr. Fletcher, of the Government Central Experimental Farm, whose kind advice and assistance I found invaluable. He provided me with all the maps extant of British Columbia, gave me several introductions, and further, entertained me with a delightful day's collecting in the lovely Canadian woodlands near Ottawa. The season was late and we only took eight species of butterflies on the 24th of May, although the weather was perfect. I next went westwards to Calgary, situated amid the lowest foothills of the Rockies, and Mr. Wolley Dod hospitably entertained me at his ranch, 18 miles south-west of Calgary. Here I spent two days very agreeably, and was much interested by Mr. Wolley Dod's fine collection of local moths and butterflies. But the weather was unfavorable, and I caught very few insects. I failed to get the local prize, Chionobas (*Œneis*) Alberta, which has, of late years, become very scarce. It formerly swarmed all around Calgary. I took Ch. varuna, E. discoidalis, and a few other insects. My next halt was at Banff, where I had a fine day and secured good specimens of Brenthis Freija and B. frigga, besides one solitary Euchloe creusa which I never met with anywhere else. I also got a last ragged straggler of Thecla eryphon high up among the pines.

June 4th found me at Victoria, where I remained for two days, and had rather indifferent weather. I here took Papilio eurymedon, P. rutulus, and Basilarchia Lorquinii, besides a few less remarkable butterflies. The woods swarmed with Cyaniris pseudargiolus. I took a great number, but all much rubbed.

June 7th, I went to pay a visit at a ranch on the mainland two miles north of the boundary line and about three miles from the sea. Here, again, weather was indifferent, but I was lucky enough to take Parnassius clodius, Papilio zolicaon (the only one I ever met with), and Phyciodes pratensis var Orseis.

Taking the C.P.R. eastwards from New Westminster, I went to Sicamous, and thence by rail and steamer down the hundred-mile-long Lake Okanagan to Penticton, where I came into the "dry belt," and found glorious weather. South of the Okanagan, Arrow and Kootenay Lakes, I spent the remainder of June, and caught a great many butterflies; of which the best is Erebia Vidleri—hitherto supposed to be peculiar to Mt. Cheam, on the Fraser—appearing in August. I did not know what it was when I took it in the valley of the Upper Keremeos, about twenty miles south-west of Penticton and over one hundred miles south-east from Mt. Cheam, at an elevation of 4,000 feet, in mid-June.

Holland does not mention the species at all, and I did not appreciate my good fortune and wait for the female to appear, as I expected to find it again elsewhere. In the Upper Keremeos I also took Chrys, zeroe, Lycæna sagittigera, and one ragged specimen of Thecla spinetorum, whilst higher up Brenthis frigga and B. freija were abundant. Close to the boundary, south of the mining town of Greenwood, Colias Alexandra v. Emilia was very common, and the same grassy slopes produced numbers of the lovely L. Acmon, L. heteronea and Melitæa chalcedon. On the mountain above Greenwood I again took P. clodius—perhaps at its most eastern limit. Near Nelson I took V. California, Thecla sæpium, and other interesting butterflies. From Nelson I went up Lake Kootenay to Kaslo, where I arrived June 30th, and found good quarters in the excellent hotel of a very keen entomologist—Mr. Cockle. I remained in this district for a week. Colias interior was probably my best catch. I also got a great many Argynnis, all of three species, Monticola, Atlantis, Eurynome and var. Clio, showing considerable variation; 2 specimens of Lycæna anna, and one high mountain Lycæna, which Mr. Cockle considered to be Podarce, but I fail to see any difference between that specimen and the series which I took, later on, at Lake Louise, and which Mr. Elwes pronounces to be Aquilo.

Mr. Cockle has a good collection of local Lepidoptera, and sent home by me some rare and interesting insects for the collection at the British Natural History Museum.

On July 11th, I went to Glacier, in the Selkirks, 4,000 feet above the sea. The weather was tolerable, but there were very few butterflies about, a few Brenthis epithore and Pamphila mandan—the American name for C. Palæmon), being all that I saw in two days.

On the 14th July I met Mr. Wolley Dod at Lake Louise, where there is a beautifully situated mountain hotel (altitude 6,000 feet) two miles from Laggan. Here we spent a week, of which the first four days were dull, cold, and miserable, with very occasional gleams of sun and frequent storms of hail and sleet; then came three days of perfect weather, such as the mountaineer and butterfly hunter dreams of for years afterwards. We made the best of our luck. B. astarte, B. alberta, Ch. Beani, Chrys. Snowi, Lycæna aquilo (Orbitulus var Franklini), Colias elis, C. nastes, and others, filled our boxes to overflowing.

On the 25th, Mr. Wolley Dod returned home, and I went into camp at Hector, just at the summit of Kicking Horse Pass (5,190 feet). I spent the remainder of the summer camping in the Rockies.

I thoroughly worked the Lake O'Hara district, on the south-western side of the great mountains whose northern precipices enshrine Lake Louise and her sister lakes. Then, returning eastwards to Banff, I went three days' march (about fifty miles) south-westwards to Mt. Assiniboine, a splendid peak 11,800 feet high, just west of the Divide, and the southernmost outlier of the glacier fields of the northern Rockies. Here I spent five days, in fine weather, though the nights were frosty, and then a week's march brought me to Field, and I encamped at Emerald Lake, about eight miles north of Field, and well on the western slope of the Divide. Here we were close to the Yoho Valley, where there is a National Park reserve and splendid scenery. It was August 19th, when three days of bad weather set in, which delayed me, and killed the butterflies. For although we afterwards had five splendid days in the Yoho, and made excursions right on to the great Wahputek glacier, I caught very little. A battered B. astarte, a much-worn B. alberta, a few Colias minismi, and several fresh Grapta zephyrus were all my captures.

I greatly regret my late arrival in the Yoho, as I believe that earlier in the season I might have found different insects to those I caught on the summit and eastern side of the Divide. Prof. Macoun, the celebrated botanist, told me that during two days' plant collecting around Field he gathered no less than forty-two species of plants which do not grow east of the Kicking Horse Pass, and the same variety might probably occur among the Lepidoptera.

Around Lake Louise, Lake O'Hara, and Lake McArthur, all high Alpine lakes, surrounded by glacier mountains, I took much the same butterflies, more or less commonly. Mt. Assiniboine afforded some variety. I took Parnassus smintheus var. Behri only at Simpson's River, about twenty miles north of Assiniboine, in a steep gorge with rock faces, above tree level. B. amphirape (or myrina) swarmed on the wet ground near Lake Assiniboine. Everywhere Brenthis astarte was to be seen (though not generally to be caught) on every rocky peak over 8,000 feet, and Brenthis alberta was equally well distributed at a rather lower level. With Astarte, on the highest summits, Ch. Beani was invariably abundant, and Chrys. Snowi shared the haunts of Alberta, only it was rather less common. Ly. aquilo was to be had still lower down, rather local, but very common where it occurred. It fairly swarmed on the damp path at the head of Lake Louise, and on a warm and very steep slope above Lake O'Hara. Colias minismi was very common everywhere on grassy slopes from 5,500 feet to 6,500 feet, whilst the beautiful orange Elis was less abundant and flew at a higher level. C. nastes was very common, on all the highest grass, and varied a good deal. The specimens I took on Mt. Assiniboine were generally paler than those from the more northern mountains. Melitea anicia var Beani and a small mountain form of probably M. rubicunda, occurred on all the higher slopes of Lake

Louise and Hector district. Chionobas Chryxus was also plentiful everywhere. Ch. jutta only at Lake Louise and in Lake O'Hara valley, half way down.

On the 29th of August I left camp and started homewards. I had one day at Banff, where I got V. antiopa, just out of chrysalis, and Colias christina—very common, but considerably the worse for wear. Then I had one day at Ottawa, and half a day at Montreal, which concluded a most agreeable expedition. But the only district that I thoroughly worked, and where I got most of the insects that were to be had, is the central chain of the Rockies, on both sides of the Kicking Horse Pass.

I cannot conclude without expressing my acknowledgments to Dr. Fletcher of Ottawa, Mr. Wolley Dod of Calgary, Mr. Wheeler (C.P.R. Survey), and Mr. Cockle of Kaslo, for the great kindness and attention they showed me. And I must also make mention of James Simpson, my guide and packer, who ran my camp, took care of me, and helped me to catch butterflies. I never saw a better man with the net nor one with a quicker eye for any variation in an insect, and I can honestly recommend him to any entomologist wishing to collect in the Rockies.

Catalogue of Butterflies Taken in Canada During 1904.

1. *Parnassius clodius.* Common on the Island of Vancouver, where I was too early for it. I took it first on the Pacific coast early in June at sea level, or but little above, and at Greenwood, about 200 miles inland, at the end of June.

2. *P. smintheus.* This is the common representative of the genus throughout the Rocky Mountains. It was common at low elevations all through June, at Nelson and Greenwood, and at Kaslo in July. I took two or three specimens of the fine dark female variety *Hermodur.* In August, in a mountain gorge near Mt. Assiniboine, at a height of 7,000 feet, at least, well above tree level, I found var. *Behri* just appearing (August 13th). No females were then out, and I never met with the insect at Lake O'Hara, or in the Yoho valley later in the month.

3. *Papilio eurymedon.* Common on the Pacific coast and eastwards as far as Kaslo. In Vancouver Island it is very abundant.

4. *P. rutulus.* Common all through the west of British Columbia. Mr. Wolley Dod does not appear to have taken it at Calgary.

5. *P. glaucus* var. *turnus.* Not so common as *Rutulus*, but more widely distributed. It was very common at Greenwood, near the boundary, in June.

6. *P. zolicaon.* One specimen only, close to the Pacific coast at the boundary. It very nearly resembles *Machaon*, but Dr. Dyar gives *Machaon* as a different species, represented in America by var. *Aliaska*, taken in Alaska only.

7. *Pontia occidentalis.* Very common all through British Columbia on the western slope of the Divide right down to the coast.

8. Var. *calyce* is the high mountain form of *occidentalis*, and is much paler on the under side, and the veins yellower.

9. *P. rapæ* is an emigrant from Europe, and not a welcome one. This was the first butterfly I caught on landing at Quebec in May. It is common all through Canada to the Pacific.

10. *P. napi.* Another European emigrant, universally common but nowhere destructive.

11. *Synchloe creusa.* Of this insect I only took a solitary specimen at Banff, June 2nd. It was probably nearly over, and I saw no more of it. It is taken on the Pacific coast and crosses the Divide at Banff. Mr. Wolley Dod inclines to think that it merges into *ausonides* at Calgary. I consider my specimen from Banff to be quite distinct.

12. *S. ausonides.* Widely distributed but nowhere common. I took one or two specimens at Penticton, Greenwood, Kaslo, and Nelson, but never found it plentiful anywhere. It is common at Calgary.

13. *S. sara.* Common all through the south-western districts of British Columbia. I did not get either of its varieties. It does not occur at Calgary and probably does not cross the Divide.

14. *Eurymus* (*Colias*) *Meadii* var. *Elis.* Scattered rather sparingly over all the high mountains of the main chain of the Rockies at an elevation of 6,500 to 7,500 feet. I took the greatest number on the steep slopes of a mountain above Hector Lake. It also occurred at Lake Louise, Mt. Assiniboine and mountains above Simpson River.

15. *E. eurytheme var Keewaydin.* Of this butterfly I only took two specimens at Victoria, June 6th.

16. Var. *eriphyle* is the commonest *Colias* all through Western Canada. I took it everywhere, and without any great variation. The beautiful orange type of the species and var *Ariadne* I did not meet with. I also took two in the Fraser Canyon in May, and a fine fresh one at Banff August 30th.

17. *C. philodice* is also very common and widely distributed. I never took it at a high level, but it is the commonest butterfly at Montreal and Ottawa in September. At Ottawa (September) a fine white female variety was common.

18. *E. christina.* At Banff only, where it was flying in plenty August 30th, but in very bad order, and the females far worse than the males. It is common at Calgary.

19. *E. alexandra.* One specimen only, from Greenwood, near the boundary.

20. ——. Very plentiful in the valley from Greenwood to Midway. It also occurs through the whole of British Columbia south of Lake Okanagan. The color of the under side is much yellower than in the type (*Alexandra*), in which the under side is greenish and very pale. Dr. Rebel pronounces the specimens I sent him to be *Behri* (Edwards), but in this opinion Mr. Elwes does not agree (nor do I).

21. *E. interior.* I took it only at Kaslo, where it is not very common. Mr. Wolley Dod takes it in some numbers at Calgary, where it flies among the spruce in July, which is just where and when I took it at Kaslo.

22. *E. pelidne* var. *Minismi* (Elwes). This a very common butterfly over the whole of the higher Rockies, flying from 5,000 to about 6,000 feet. The females vary considerably, the white ones being commoner than the yellow. It flies all through August. (Dr. Rebel pronounces this insect to be not *Pelidne,* but *Skinneri* (Barnes), which he considers to be a good species.)

23. *E. nastes.* Common at very high levels on every mountain I went up in the whole chain of the Rockies. It varies considerably and I think that those from Mt. Assiniboine, the most southern point at which I found them, are paler and yellower than more northern specimens.

24. *Euptoieta Claudia.* One specimen only taken at Mt. Assiniboine in August, close to the lake, at 5,000 feet or more. It is a southern butterfly.

but a wanderer. Mr. Wolley Dod has taken two at Calgary, and there is one in the Banff museum.

25. *Argynis cybele.* Common all through the Atlantic States. Mine were taken at Ottawa, in September. Mr. Wolley Dod gets it at Calgary, but not commonly.

26. *A. atlantis.* Very common and widely distributed all through British Columbia. I took it at Kaslo, Greenwood and in the high Rockies below tree level. *Atlantis* is very like *Electa,* which Mr. Wolley Dod takes, though not commonly. I have no specimens of *Atlantis* from Calgary.

27. *A. monticola.* Widely distributed and common. I took it at every place I visited from the third week in June till the end of August. The high mountain specimens differ little from those at lower levels. It is a variable species as to color and the silvering of the spots of the under side, but the markings are the same in all that I have taken.

28. Var. *purpurascens,* which I took only near Greenwood and Nelson at low levels. It is given by Holland as a variety of *Zerene.* Dyar gives it as a variety of *Monticola,* with which its markings exactly coincide. I do not possess *Zerene.*

29. *A. coronis.* I never took this species at all on the western side of the Divide, but I believe that I got a battered individual at Banff, August 30th. Those I have were all taken by Mr. Wolley Dod near Calgary, where it is not uncommon. Very like *Halcyone.*

30. *A. nevadensis.* Widely distributed through the Rocky Mountains, but I never saw it common except at Banff, where there were many, much worn, August 30th. It ranges as high as tree level, but I never took it west of the Divide. Common at Calgary.

31. *A. nevadensis* var. *Meadii.* One, June 18th, in the Upper Keremeos, and one, much battered, at Mt. Assiniboine, August.

32. *A. eurynome.* Widely distributed, nowhere common. I took a fine dark form in the Selkirks at about 8,000 feet. I also took a paler form at Kaslo.

33. *A. eurynome.* var. *Clio.* Also widely distributed and not common. My high mountain specimens are all much paler than the Kaslo insects.

34. *Brenthis myrina* is the *amphirape* of the Eastern Hemisphere. I found it in swarms at Mt. Assiniboine in August, flying over the marshy ground near the lake, which was formerly the basin of a great glacier. I also took it by Lake Louise in July. Mr. Wolley Dod takes it commonly at Calgary.

35. *Brenthis chariclea.* Very common everywhere in the Rockies among brushwood. Common at Calgary.

36. *Brenthis chariclea* var. *Boisduvalii,* is apparently undistinguishable from *Chariclea,* though Holland gives it as a separate species.

37. *B. chariclea* var. *obscurata.* I have so called a remarkably dark female taken near Lake Assiniboine, very high up.

38. *Brenthis freija.* Common in May at Calgary and Banff. Also took it in mountain bogs near Lake Okanagan in June at 5,000 feet or more.

39. *B. frigga.* Common in bogs at Banff and Calgary, also took it near Lake Okanagan in mountain bogs.

40. *B. bellona.* Common at Calgary, Ottawa, and generally west of the Divide.

41. *B. epithore.* The Pacific form of *Bellona.* Common and generally distributed. Flies at high elevations.

42. *Brenthis alberta.* Nowhere in great numbers, but widely distributed over the higher peaks of the Rockies end of July and August. All the peaks round Lake Louise and Lake O'Hara, Hector, Mt. Assiniboine, and head of Yoho valley, produced a few specimens (not always captured). I never saw it below 7,500 feet.

43. *Brenthis astarte* is another very common butterfly, if you seek it on the highest points not entirely snow-covered. It is very hard to catch, but very unmistakable to the eye. It has an even wider range than *Alberta,* for I saw it, without securing one, at Glacier Crest in the Selkirks. The males haunt the summits, the females are to be found on the highest grassy slopes, and are not very hard to stalk, when feasting on a flower.

44. *Lemonias (Melitæa) chalcedon.* I took this fine insect only at Greenwood and in the district south-west of Lake Okanagan.

45. *L. anicia.* The commonest of the family. I took it at nearly every place I visited. Penticton, Kaslo, Lake Louise and the Selkirks all produced it in plenty; but Mr. Wolley Dod finds it rare at Calgary.

46. *L. anicia* var. *Beani.* A small and dusky high mountain form of *Anicia,* not uncommon on the highest grass slopes about Lake Louise, Hector and Lake O'Hara. I never saw it under 7,000 feet.

47. *Lemonias nubigena.* Two specimens only, from Revelstoke, a very hot place, 1,400 feet.

48. *L. rubicunda.* Another Californian insect, which extends into the Rockies as far north as Hector and Lake Louise. I never took it commonly. It may be so around Lake Okanagan in July.

49. *L. palla.* Common about Lake Okanagan, Greenwood and Kaslo in June. I never took it in the Rockies, but Mr. Wolley Dod gave me a specimen from Red Deer, 100 miles north of Calgary. There the winter is remarkably mild.

50. *Phyciodes tharos.* Very common at Nelson, Kaslo and Calgary. Did not find it in the mountains.

51. *Phyciodes pratensis.* Universally common. A small mountain form occurs at Hector, at 5,000 feet.

52. *Phyciodes pratensis* var. *Orseis.* Ranked as a species by Holland. Probably the south-western form of type. I took mine on the Pacific coast.

53. *Phyciodes camillus.* Common at Greenwood and Penticton in June, and I took one at Hector, at 5,500 feet, in July.

54. *Psyciodes mylitta.* In the Okanagan country in June. I took none in the mountains or further eastwards.

55. *Polygonia satyrus.* At Victoria in June, and at Calgary in May, all hibernated specimens.

56. *Polygonia faunus.* At Victoria only in June. Mr. Wolley Dod reports it from Calgary and Banff, but not commonly.

57. *P. zephyrus.* At Field, common in August, and at Banff.

58. *P. gracilis.* At Ottawa and Montreal only. It does not appear to occur in British Columbia.

59. *Polygonia oreas* var. *silenus.* Two specimens at Banff, August 30.

60. *P. progne.* One at Calgary, 31st May, one at Ottawa in May, and several at Ottawa in September.

61. *Eugonia californica.* Two fine fresh specimens at Bonnington Falls, near Nelson, end of June.

62. *Euvanessa antiopa.* Just appearing at Banff in August. It is common all through Canada and I took worn specimens in June in the Upper Keremeos.

63. *Aglais milberti.* Very common all along the Pacific side of the Selkirks, and I took it high up, 8,000 feet, above Glacier. I never saw it in the Rockies, but it is common at Calgary.

64. *Vanessa atalanta.* One specimen only, in July, above Kaslo. I saw one other at the same place; no others. It is very rare at Calgary.

65. *Basilarchia archippus.* One specimen only at Penticton, near the river. I saw one other at the same place. It is an occasional visitor at Calgary.

66. *B. Lorquinii.* Very common all through the western slopes of the Divide and flies at Glacier. Not seen by me in the Rockies and not found at Calgary.

67. *Cercyonis charon.* Common at Penticton, Nelson, and Banff, at low levels throughout the summer.

68. *Erebia discoidalis.* Very common at Calgary and Banff in May at moderate elevations. I never saw it west of the Divide.

69. *Erebia Vidleri.* Plentiful in the open woodlands of the upper Keremeos, in mid-June at an elevation of from 3,000 to 4,000 feet. Only males had then appeared. I did not take it on similar ground at Nelson and Greenwood a week later.

70. *Erebia epipsodea.* The commonest *Erebia* from Penticton to Calgary and flies as low as 2,500 feet.

71. *Cœnonympha ampelos,* or *ochracea,* or *inornata.* Very common everywhere at moderate elevations from Victoria to Calgary. Mr. Wolley Dod cannot separate the species.

72. *Cœnonympha elko.* One specimen only, near Lake O'Hara, in August. Evidently a wanderer.

73. *Œneis Macounii.* Taken by Mr. Wolley Dod near Calgary. He took this rare butterfly in some numbers in June last, on the summits of grassy hills, about 4,000 feet.

74. *Œneis chryxus.* Very common everywhere from the warm slopes of Okanagan and Nelson right up to the high glens of the Rockies, even above tree level. It varies little. Mr. Wolley Dod has never taken it at Calgary, but it flies at Banff.

75. *Œneis varuna.* At Calgary only, where it is common in May and June. I never saw it at Banff, or in the Rockies.

76. *Œneis jutta.* Not uncommon in mountain marshes. I took mine at Lake Louise in July. It is common at Calgary.

77. *Œneis norna* var. *Beanii.* This active butterfly is common on all the high rocky summits of the Rockies. It haunts lichen-covered rocks, which it exactly resembles in color. I never found the female lower down, as was the case with the *Astarte* female.

78. *Uranotes melinus.* At Kaslo and at Bonnington Falls in June.

79. *Thecla sæpium.* At Bonnington Falls, just out, third week of June. I was too late for it at Kaslo.

79½. *Thecla augustus.* Banff, May.

80. *Thecla spinetorum.* One much worn female, upper Keremeos, June 18th.

81. *Thecla acadica.* One at Kaslo, where it is common. I was too late for it.

82. *Callicista eryphon.* Banff, in May, high up among pines.

83. *Callophrys dumetorum.* Several wretched specimens at about 5,000 feet in June, above upper Keremeos. Probably common earlier.

84. *Chrysophanus thoe.* At Ottawa along the railway banks in September, rather common, but worn. It also occurs at Calgary.

85. *Epidemia mariposa.* Very common everywhere in the Rockies, and flies up to 6,000 feet.

86. *Epidemia zeroe.* Not uncommon in the south Okanagan country, and at Greenwood. I never found it in high mountains.

87. *Epidemia helloides.* Very common everywhere in the west at low elevations.

88. *Heodes hypophleas.* Not common. I took several at Ottawa. Mr. Wolley Dod takes it sometimes near Calgary.

89. *Chalceria Snowi.* The most beautiful of the coppers. A high mountaineer, never seen below 7,000 feet. Widely distributed over the high Rockies, but seldom plentiful.

90. *Cupido heteronea.* At Greenwood and in the lower Keremeos in June. I met with it nowhere else.

91. *Cupido fulla.* I have this butterfly from Calgary only, where Mr. Wolley Dod takes it commonly. Mr. Elwes considers it to be identical with *pheres,* which it closely resembles.

92. *Cupido sæpiolus.* Very common everywhere and flies up to 6,000 feet at Hector. Very common at Calgary. Dr. Rebel calls it *L. antiacis.*

93. *Cupido pheres.* Common in the south-west of British Columbia, Penticton, Greenwood and Vancouver. Not taken at Calgary. It is very near to *C. fulla.* Dr. Rebel calls my specimens *L. lycea* (Edw.).

94. *Nomiades Couperi.* Very common on both sides of the Divide, but not high up. Very like *Antiacis.*

95. *Phædrotes sagittigera.* Not common. I only took three at Greenwood and upper Keremeos. It is taken occasionally at Calgary and Kaslo.

96. *Agriades aquilo.* A high mountaineer, locally abundant at Lake Louise, Hector and Lake O'Hara.

97. *Agriades rustica.* Very common at Calgary. I never took it at all.

98. *Agriades podarce.* One specimen only, taken July 5th, on Bear Mountain, behind Kaslo, which is a locality for *Podarce.* I was too early to get a series and have no female, which is said to be distinct. The male is exactly like *Aquilo.*

99. *Rusticus melissa.* Very common everywhere up to 6,000 feet. (*Argus.*)

100. *Rusticus acmon.* Common near Greenwood. A southern insect.

101. *Rusticus anna.* Two from Bear Lake, which is a locality for it, and one female from Penticton. A southern insect.

102. *Everes amyntula.* Common everywhere in the West, also at Calgary.

103. *Everes comyntas.* Not common. My specimens are from Penticton. It is taken at Kaslo and at Victoria.

104. *Cyaniris pseudargiolus.* Very common and variable.

105. *Amblyscirtes vialis.* Only taken by me at Greenwood, June. Reported from Vancouver and Kaslo.

106. *Pamphila palæmon.* Very common and flies as high as Glacier.

107. *Erynnis comma.* Very common and widely distributed.

108. *Polites peckius.* Only one at Nelson, June. Reported from Calgary.

109. *Anthomaster leonardus.* Only at Ottawa, in September.

110. *Thymelicus cernes.* Common at Penticton, June. Reported from Coldstream (Pacific coast) and Calgary.

111. *Thorybes pylades.* At Penticton, much worn, in June. Reported from Kaslo and Calgary.

112. *Pholisora catullus.* Common at Penticton.

113. *Thanaos juvenalis.* At Ottawa only. An eastern insect.

114. *Thanaos persius.* Very common at Greenwood, Penticton, Vancouver and Calgary.

115. *Thanaos icelus.* Common and widely distributed.

116. *Hesperia centaureæ.* One only, very high up, above Lake Louise. None reported from other places.

117. *Hesperia cæspitalis.* Common in upper Keremeos, but nearly over. Common near Victoria (May). Not common at Kaslo and Calgary.

Notes on the above Paper by Dr. James Fletcher.

The above extremely interesting paper by Mrs. Nicholl was kindly given to us for publication last summer. Unfortunately, Mrs Nicholl's absence exploring in the Rocky Mountains during the summer, my own subsequent absence from Ottawa, and the early call for the manuscript for the Report, made correspondence with Mrs. Nicholl, about some of the above named species, impossible. As it is important that the paper should be published without delay, I add a few notes concerning some of the species, with regard to which there was some doubt, thinking that as I have collected in most of the localities mentioned, these might be of use to lepidopterists.

6. *Papilio zolicaon* is a black swallow-tail with yellow markings, *machaon* on the other hand is yellow with black markings. *Oregonia*, which flies in the interior of British Columbia, is much more like the European *machaon* but is larger. It is easily separated from *zolicaon* by its larger size, broader areas of yellow, particularly on the lower side, and by the characters of the large red ocellus at anal angle, which is much more like that of *machaon* than of *zolicaon*, not being pupilled, as a rule, but with the margin running round into the lower part of the ocellus and ending in a club-shaped expansion, with or without a short spur at the extreme anal angle. The characters are best seen on the lower side.

11. *Synchloe creusa* is smaller than *S. ausonides*, is greener beneath, with the spots smaller and silvery pearly. The black discal spot on the primaries beneath is cut off square at the bottom, where it runs along the vein. In *ausonides* this spot tapers.

20. This was probably *Colias emilia* which flies in the Okanagan valley just at the time Mrs. Nicholl was there. The male is like a large *interior* but sometimes has an orange flush. The female is very much like some females of *christina*. Both sexes have beautiful red fringes. *Alexandra* has a white fringe and a silvery white spot beneath on the lower wings. In *emilia* the spot is white but is more or less conspicuously ringed with pink. *Edwardsii*, as I understand that species, is like *alexandra*, but has pink in the fringe, and some of the females are marked as in *christina* female. *Behrii* in no way resembles the species above referred to. It is a small, very dark green thing. There must have been some mistake about the specimens examined by Dr. Rebel.

22. *Eurymus pelidne*, var. *minismi*, Elwes. I cannot find that this name was ever published, although Mr. Bean always spoke of the insect Mrs. Nicholl refers to, under the name of *minismi*. *E. pelidne*, var. *Skinneri* is the same thing.

24. *E. claudia* is a prairie species. The larvæ are sometimes destructive to pansies and other violets in gardens.

26. *Argynnis atlantis*. The Rocky mountain species called *atlantis* by Mr. Elwes is claimed by Mr. Edwards to be *electa*. There is only one form in our Rocky Mountains.

Melitæa chalcedon has not so far been recorded from a Canadian locality. Possibly this may be *Macglashani*, which occurs in the Boundary country.

M. nubigena. True *nubigena* has not been recorded from Canada.

48. *M. rubicunda*. ditto.

54. *Ph. mylitta* is a small species expanding about 1 inch to 1¼ inches. All that I have seen from the Okanagan are a somewhat similar species, *Ph. Barnesii*, with a large female expanding about 1½ inches.

71. *Cœn. ampelos*. This species at least is easily recognised by the absence of ocelli and by its silky pale fawn color. It is the only *Cœnonympha* on Vancouver Island. *Inornata* is much darker in tone than *ochracea* and has much less white beneath.

72. *C. elko* is a synonym of *ampelos*.

88. *Heodes hypophleas*. The species taken by Mr. Wolley-Dod near Millarville, south of Calgary, is a magnificent insect larger and far finer than any form of *hypophleas* we have in Canada. I hope Mr. Dod will describe it.

92. *Cupido sæpiolus*. This species in no way resembles *antiacis*. The male is silvery blue above, has a double row of spots on hind wing beneath and two or three reddish spots at anal angle above. None of these characters are found in *antiacis*.

93. *Cupido pheres*. The form of this species on Vancouver Island is the variety *ardea* which has the spots beneath almost obliterated. *Lycea* is like *fulla* but is violet blue above, not the silvery blue of *pheres*.

94. *Nomiades Couperi*. The mountains form here referred to is called *lygdamus* by Canadian collectors following Mr. W. H. Edwards.

100. *Rusticus acmon*. Common across the plains.

101. *Rusticus anna*. Not uncommon on Vancouver Island and at many places in the mountains.

103. *Everes comyntas*. I never saw this from Vancouver Island. *Amyntula* is common everywhere from Manitoba to the Coast. The differences are slight, but the two species can, as a rule, be easily separated. *Comyntas* is less silvery beneath and altogether a more eastern-looking species.

INSECTS INJURIOUS TO ONTARIO CROPS IN 1905.

By James Fletcher, Dominion Entomologist, Ottawa.

In nearly all parts of Canada, weather reports have shown favourable conditions for the growth and maturity of crops, and Ontario has been no exception in this respect. Although reports have mentioned a large number of different kinds of insects which have been more or less noticeable by their attacks upon crop-plants, there have been fewer bad outbreaks of injurious insects than has been the case for many years; and the general report of the year in Ontario is that there have been no attacks of special importance and no new enemies which are likely to be the cause of serious loss in the future. Notwithstanding this, however, there are still plenty of the old and well known enemies which require the attention of the fruit grower and farmer; and this seems an appropriate time to again reiterate the warning that the most effective time to fight injurious insects which are known to have extensive powers of injury, is just when they occur in small numbers, as evidenced by slight injury. It becomes more and more apparent every year that preventive measures for warding off insect attack should become general principles of agriculture to be applied as a matter of course every year.

Now that spraying fruit trees to protect them against injury by the Codling Moth and the Black Spot fungous disease, has become such a matter of course with the leading fruit growers, there are numberless instances which might be cited in proof of the statement that orchards which are sprayed every year gradually become so free of their enemies that practically they may be said *always* to produce clean fruit, whereas in neighbouring orchards where no spraying is done, the opposite to this is the case.

CEREAL CROPS.

The worst enemies of grain crops have been conspicuously absent during the season of 1905. There have been no complaints at all of Hessian Fly; and, although, if looked for carefully, it was possible to find in one or two localities the orange larvæ of the Wheat Midge, there have been no reports received from farmers of their occurrence. Neither Wireworms nor White Grubs were mentioned in grain crops. The only exception to the general immunity was in the case of a locally rather severe occurrence of the Wheat Joint Worm (*Isosoma tritici*, Fitch). This was at Millbrook, Ont., where it did considerabe harm. Mr. T. D. Jarvis, of Guelph, also mentions Joint Worms as the cause of injury to both wheat and barley in western Ontario.

In Ontario there is only one annual brood of the Joint Worms, the insects passing the winter as larvæ within cells which they have hollowed out inside galls made at joints of the swollen and distorted straws, Fig. 29. These are, for the most part, so near the ground that a large proportion of the larvæ are left in the fields in the stubble. The ploughing down deeply or the burning over of stubble in autumn reduces the numbers of the larvæ which can turn to flies the following spring. That part of the stem which is attacked, generally swells and makes a distorted and bent gall; but this is not always the case, the attacked portion of the stem simply becoming thickened and hardened. These hardened portions frequently break off in threshing and are either carried through with the grain or with the small seeds. When cleaned out, they should be destroyed and not left on the ground, where the flies can hatch the following spring and fly to the fields. When the screenings are fed, these should always be crushed; but, if fed to chickens, it should be done where the galls will be trampled under the feet of stock or otherwise destroyed. The straw from an infested crop should be either fed or burnt before the ensuing spring. A regular and short rotation of crops and the mowing down of all grasses along the borders of fields, have been found useful in controlling these enemies of the wheat grower.

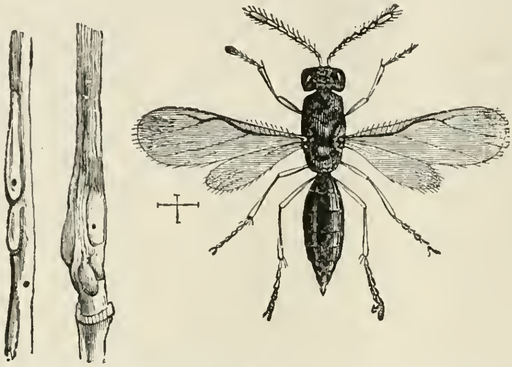

Fig. 29. Wheat-Joint Worm Fly (much enlarged), and stems showing galls.

Peas in Ontario have been an excellent crop, without any injury by insect enemies. The Pea Moth seemed almost entirely to restrict its attacks to the seeds of wild legumes such as the Purple-tufted Vetch, the Wild Tare and the Cream-coloured Vetchling. The Pea Weevil has only been reported with regard to its disappearance; and we again point out the importance of everybody insisting on having all seed pease fumigated before

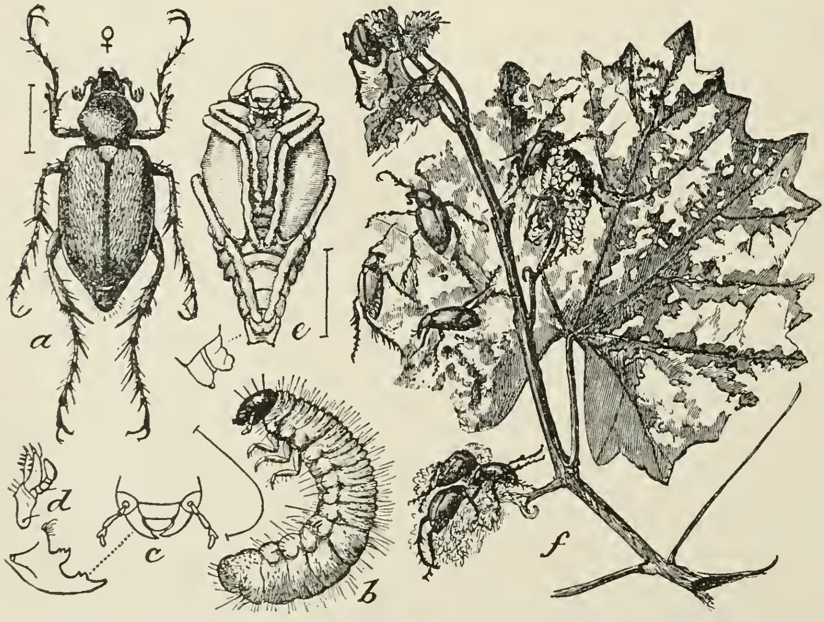

Fig. 30. Rose Chafer (*Macrodactylus subspinosus.*) *a*, beetle; *b*, larva; *c* and *d*, mouthparts of same; *e*, pupa; *f*, injury to leaves and blossoms with beetles, natural size, at work. After Marlatt, U.S. Dept. Agriculture.)

sowing them. The reputation of our Canadian grown pease has risen again rapidly since last year, on account of their freedom from weevils; but growers may remain perfectly certain that, if they again become negligent and do not treat their seed pease, they will have to suffer for it, by the Pea Weevil increasing in numbers and in destructiveness.

FODDER CROPS.

The loss in grass and fodder crops in 1905 from insect enemies was nowhere noticeable; but there were one or two interesting occurrences from the entomological point of view. The most remarkable of these was a severe, although short, attack on young corn grown in Grey county, by the Rose Chafer. *Macrodactylus subspinosus*, Fab., Fig. 30. Late in June the beetles flew in large numbers to a field of growing corn when the plants were about eight inches high and in a good vigorous condition. They appeared suddenly, covering about two thirds of a twenty acre field; and clustered, as many sometimes as twenty insects on each plant, and devoured the leaves. This swarm remained on the corn field for only three days, during which they did considerable harm, and then disappeared as suddenly as they came.

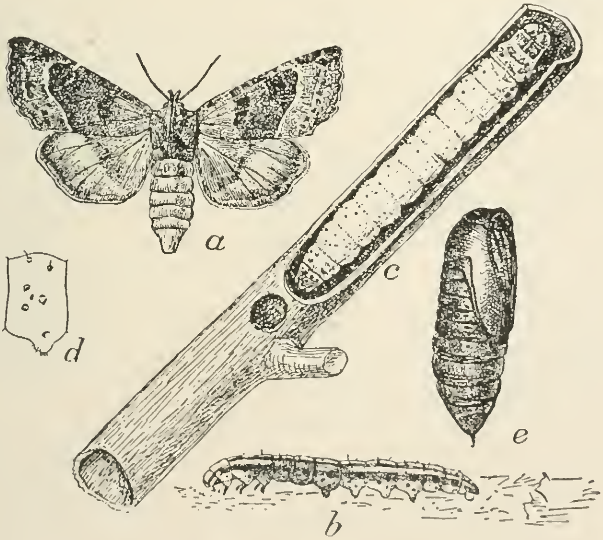

Fig. 31. Stalk-borer (*Papaipema nitela*) ; *a*, female moth; *b*, half-grown larva ; *c*, mature larva in injured stalk ; *d*, lateral view of abdominal segment of same ; *e*, pupa—all somewhat enlarged. (After Chittenden, U.S. Dept. Agriculture) Full measure.

The Stalk Borer (*Papaipema nitela*, Gn.), Fig. 31, which in past years has frequently been accused of doing injury to various plants, but of which no reared specimens were to be found in collections in Canada, was this season certainly identified from specimens sent from Fargo, Ont., by Mr. G. W. Riseborough. In previous years all larvæ sent in under the name of "*Gortyna nitela*" proved to be when reared, *Papaipema cataphracta*, Grt., which is a much wider-spread species in Canada and of which the larva is very similar to that of *P. nitela*. This is a rather general feeder, like *P. cataphracta*, but has more frequently been known as the Potato Stalk Borer, although it attacks corn probably to a greater extent even than potatoes. Mr. Riseborough found the larvæ in some numbers in his corn field and also sent specimens which had attacked potatoes and Canada Thistles. Moths were reared from these, and also some parasites. Later in the season the corn crop outgrew the injury, as there were sufficient plants left, and a good crop was reaped.

"Silver Top" in timothy and other grasses was not so much noticed as usual, although it caused some anxiety in Middlesex county early in July. The cause of this whitening of the head is the work of a very small insect belonging to the Thripidæ, probably *Phlœothrips poaphagus*, Comstock, which attacks the soft growing base of the top joint, inside the uppermost sheath. The same, or a similar injury, occurs in oats in which not the whole panicle but the lowest flowers while in the sheath are attacked and blighted, so that they turn white and never develop. The injury of the Grass Thrips is of an intermittent nature, but is always much worse in meadows which have been down to grass for many years, and particularly when the land is exhausted or of low fertility. There is no remedy which can be applied to grass lands; but a short rotation by which the land is ploughed up at short intervals and used for other crops, has been of great advantage. The presence of the Grass Thrips was noticeable in almost all localities through the province, wherever looked for, and the only reason it was not more complained of, was the abundant growth of all grass from the frequent and well timed rains.

The Clover Seed Midge (*Cecidomyia leguminicola*, Lintner), although perhaps not quite so destructive as in 1904, was still terribly abundant and its presence could be detected by the appearance of the clover fields at the end of June and early in July in all parts of the province. It was more abundant at Ottawa than it has ever been before. No better remedy has been discovered than that one which has given such good results wherever tried, of feeding off seed clover fields up to the 20th June and then leaving the second crop for seed.

The Clover-leaf Weevil (*Phytonomus punctatus*, Fab.) occurred this year for the first time at Ottawa. No injury was noticed on the clover crop, a few specimens only of the mature beetle being taken. Although loss from this insect is seldom extensive, owing to the prevalence of the parasitic fungus, *Entomophthora sphærosperma*, Fres., which destroys the larvæ in enormous numbers. It will be well for clover growers in the district to be on guard against an outbreak next June.

The Green Clover Weevil (*Phytonomus nigrirostris*, Fab.), as is usually the case, was far more abundant and destructive than its larger and more formidable looking relative. The newly emerged perfect beetles appear in July and in autumn, and pass the winter as beetles, hidden away beneath leaves, moss, etc. The slender slug-like grubs feed upon the leaves, particularly those surrounding the forming flower heads of which they eat the stipules; they also burrow into the heads, where they destroy many of the flowers during June. When full grown, they spin pretty white lace-like cocoons inside the bracts of the clover heads. The summer brood appears early in July. When clover fields show the presence of this or the Clover leaf Weevil in large numbers, they should at once be fed off or cut. If the beetles are noticed very early in the season, it may be found desirable to plough down the clover in May and use the field for corn or for some other crop.

The Clover-seed Caterpillar (*Grapholitha interstinctana*, Clem.) was noticed in many places, the pretty little silvery moths being seen on the foliage and flying about the flowers. The injury from this insect is, as a rule, small in extent, and the same remedies will answer for it and the clover weevils.

The Red-headed Flea-beetle (*Systena frontalis*, Fab.), Fig. 32. This beetle which has a very wide range of food plants was found as a destructive pest on the second crop of clover in August, both at Ottawa and Guelph, Ont. The insect, which is a common species, was rather more abundant than usual, and it occurred doubtless at other places where it was not noticed.

ROOT CROPS AND VEGETABLES.

The favourable season enabled all garden and field crops of this class to develop well. Cutworms of a few kinds, as usual, did considerable harm locally; but there was no extensive outbreak such as sometimes occurs.

During the month of July almost all plants in the flower and vegetable garden were attacked at Ottawa by a smooth cutworm-like caterpillar, when young greenish in colour, but having the body divided into two equal parts above and below the spiracles, the back being dark with three pale lines along it, and the underside of the body yellowish up to a clear yellowish side stripe. These at first rather inconspicuously marked caterpillars, were largely nocturnal in habit, coming out at night and devouring nearly all kinds of vegetation. They were particularly destructive to the forming seed pods of larkspurs. After the last moult they were very much more conspicuously marked, presenting a handsome Mamestra-like appearance with three lines down the back and with each segment ornamented with large black velvety patches on the back and above the spiracles. The head honey-coloured and mottled. When full grown, these caterpillars are very voracious. They are about two inches in length, cylindrical in shape, like cutworms, and about a quarter of an inch in diameter. There is very much variation in their colours, some specimens being almost black, while others are of a dark olive green; but all specimens show a distinct side band and the three thread-like stripes down the back. These caterpillars were the progeny of a rare species of noctuid moth named *Barathra occidentata*, Grt., an insect which is so rare that the only specimens I had ever seen before were two reared by Mr. J. A. Guignard many years ago from larvæ which he had found destroying larkspurs in his garden; and Dr. J. B. Smith reports that it is an extremely rare insect in collections. In June, while collecting moths at Ottawa, we had found that this species was well represented among our captures, and we were pleased to secure eggs and rear the larvæ. Later, however, the caterpillars occurred in too great abundance out of doors. There is only one brood of *Barathra* in the year, the eggs being laid in June and the caterpillars feeding through July and into

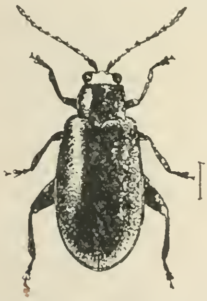

Fig. 32. Red-headed Flea-beetle (greatly enlarged) (Chittenden, U.S. Dept. Agricl.)

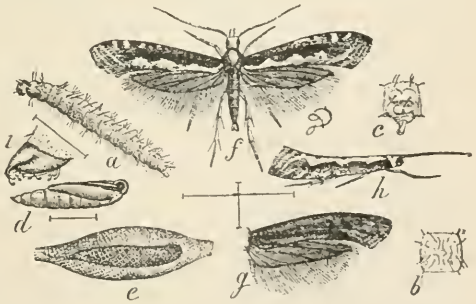

Fig. 33. The Diamond-back Moth; *a*, caterpillar; *d*, pupa; *e*, cocoon; *f*, moth—enlarged. (U.S. Dept. Agriculture.)

August. Not only was the species found in abundance at Ottawa, but specimens were sent from Nova Scotia and were also found at Nepigon, Ont., as destructive enemies of the cabbage; it also occurred at various places between these two points, and Dr. Fyles took it at Quebec. Favourite foods in the vegetable garden were cabbage and spinach.

The Diamond-back Moth (*Plutella maculipennis,* Curtis, better known as *Plutella cruciferarum,* Zell.), Fig. 33, was abundant and destructive in many places, doing considerable harm in rape fields and on Swede turnips and cabbages. The attack, however, was of rather short duration and ended sooner in the season than is usually the case. This little insect is very much attacked by a small hymenopterous parasite which this year occurred in large numbers. The remedies for controlling the small caterpillars are rather difficult of application. They consist of kerosene emulsion, or arsenical mixtures mixed with soap washes, which must be sprayed well under the leaves by means of an angled nozzle. An important supplementary treatment is to induce a vigorous growth of the crop with light surface dressings of nitrate of soda. As a preventive measure, care must be taken to keep down all weeds and plants of the Mustard Family and to destroy in autumn all refuse plants of a crop which has been attacked.

The Turnip and Cabbage Aphis (*Aphis brassicæ,* L.) did much harm to turnip crops particularly around Guelph, but also in many other parts of the Province. There is nothing new in the way of a remedy; but it is well to emphasize the importance of feeding off or ploughing down turnip tops and remnants in cabbage fields, late in autumn, so that the over-wintering eggs may be prevented from hatching.

The Turnip Flea Beetle (*Phyllotreta vittata,* Fab.) was only once or twice mentioned in correspondence; but the favourable weather which prevailed in most parts of the province at the time the young plants were starting, gave them full opportunity to outgrow the attacks of the beetle.

The Onion Maggot and Cabbage Maggot, which for the last few years have been so excessively destructive, during the past season were hardly noticeable in many localities where in previous years they had made a clean sweep of almost everything.

The Carrot Rust-Fly (*Psila rosæ,* Fab.), on the other hand, was rather more abundant than usual and extended over a wider area than for many years past. Some early carrots at Ottawa were quite destroyed; but later sowings on the same ground produced satisfactory crops. There was no injury recorded to celery or parsnips, both of which are occasional food plants of the Carrot Rust-fly. The remedies for this insect are to take great care, when thinning out young carrots, to do this late in the day, and then spray the rows at once with a deterrent preparation, such as kerosene emulsion or a carbolic wash. The time when most injury is done, is in June and July, so that two or three sprayings, a week apart, will generally have the effect of protecting the crop. The late sowing of seed has been frequently attended with good results, and carrots should never be planted in the same spot as they were grown the previous year. Should maggots be found in stored carrots, the sand in which these roots are kept for the winter, should be treated in spring so that the puparia therein contained may not give forth their flies. This may be done either by burying it in a deep hole or by throwing it into a pond or into a barnyard where it will be trampled by stock.

FRUIT CROPS.

The fruit crops of the province may be said, on the whole, to have been very good in quality, although in some localities the yield was rather light.

Apples in the Ottawa valley were abundant and in sprayed orchards of first quality. In western Ontario the crop was rather poor, the shortage being due probably to lack of vigour in the trees. The very severe winter of 1903-04 worked great havoc in orchards. The trees in 1904 bore very heavily, which fact was in many cases an indication of weakness. This made a further draught on their strength, and the result was apparent in 1905. The very fact that the crop was light this season, was a benefit to the trees. Another cause for the lowering of the average of the apple crop in 1905 was the heavy wind storm which occurred in October last. Plums were a good crop and much less injured by the Curculio than last year. Peaches and pears were abundant and of high quality. Grapes were to some extent attacked by the Grape Rot; but, on the whole, vineyards which were sprayed and well looked after gave good returns. The Grape-berry moth (*Eudemis botrana*, Schiff.), Fig. 34, was prevalent in south-western Ontario, as could be seen by traces of its work in grapes which were sent to the market. This little insect, the minute caterpillars of which eat into the berries and web two or three of them together, is apparently increasing in the grape-growing districts of the province. The remedy which has been suggested by Saunders, is to gather up and burn all leaves of the vines in the autumn, so as, at the same time, to destroy the overwintering pupæ.

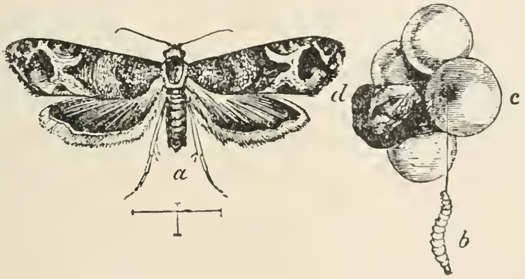

Fig. 34. Grape-berry moth ; *a*, much enlarged ; *b*, caterpillar ; *c*, grapes ; *d*, injured berry.

The San José Scale (*Aspidiotus perniciosus*, Comst.). Notwithstanding all that has been written on the subject, there is little change in the San José Scale situation. In the infested district there are still a great many fruit growers who are content to grow small, poor and almost useless crops of fruit, because they will not spray; but most of the advanced growers have now adopted the lime and sulphur wash and have grown paying crops as a consequence. That large class of fruit growers who are always on the lookout, first of all, for something new, and put off work on this score, have unnecessarily lost a large percentage of the returns which they might have had for the necessary yearly work among their fruit trees. If any new remedy is discovered which will take the place of those already in use, over-anxious people may be quite sure that it will be quickly made known and they will soon hear of it, if it proves successful. There are ample means in Canada for anyone engaged in any kind of farming to find out, free of all cost, from the Government institutions, both at Ottawa and at Guelph, what the recognized best treatment is, and they would be wise to adopt this until something better has been discovered. There is never a year passes by that some new and loudly exploited supposed improvement on recognized methods, or some new remedy, is not brought forward to be heard of for a short time and then disappear altogether. The best advice which I think can be given to those who are wise enough to acknowledge that they do not know everything about their own work, is to watch carefully and learn from their most successful and enterprising neighbours, at the same time, keeping well posted as to the progress of the experimental work of the Government officials specially engaged to investigate these matters, and to obtain and read their reports, which are published by the Government for their benefit and all of which are distributed free to all applicants.

In this connection, it may be well to mention Prof. Close's recent improvement in the convenience of making kerosene emulsion by first mixing the kerosene with lime and then simply churning it in water, and also the later improvement on this method by Mr. F. T. Shutt, in substituting flour for lime, which gives it a much wider range of usefulness. There are many parts of Canada where lime cannot be obtained easily; but flour is a necessity everywhere, and it has been found that, for a kerosene emulsion which is to be used at once, there is nothing more convenient than to mix the kerosene and flour in the proportion of one pint of kerosene to four ounces of cheap flour, and, when this is thoroughly mixed, add one gallon of water (preferably warm) for every pint of kerosene. The whole is then vigorously churned for from two to five minutes, and the emulsion is ready for use. Even a weaker mixture will answer if the emulsion is to be used immediately; for two ounces of flour will emulsify, or more correctly hold entangled around its molecules, one quart of kerosene for a sufficient time to be applied by a spraying pump; but, on standing for a short time, the kerosene will separate from the water. Mr. Shutt has also found, however, that by scalding the flour before adding the kerosene, an excellent emulsion which will not separate for several days, can be prepared with two ounces of flour and one quart of kerosene, mixed with two gallons of water. For immediate use and particularly in gardens and over small areas, this emulsion will be of the greatest value. The above quantities for making the new emulsion give a percentage of coal oil to water equal to that contained in the ordinary Riley-Hubbard formula, which has two gallons of coal oil in every thirty gallons of wash ready for use.

These new kerosene emulsions have been very much discussed in connection with work against the San José Scale; and it is probable that, if their application were persisted in, they would finally vanquish the San José Scale; but the cost of labour and materials in these frequent applications would probably render them unpractical remedies. For this redoubtable enemy, something more drastic is necessary; and the lime and sulphur wash which has so frequently been recommended in our reports, is still the best standard remedy for that insect. The recently sent out proprietary remedies "Kil-o-Scale" and "Scalecide", notwithstanding their forbidding names, are said by Dr. J. B. Smith, of New Jersey, to have given good results. These are petroleum preparations prepared, I believe, to a large measure in accordance with Dr. Smith's advice. For the meantime, however, the lime and sulphur wash remains the standard remedy for the San José Scale, and, if regularly and carefully used, will keep trees in a healthy condition and enable them to produce paying crops of fruit.

The Woolly Aphis of the Apple (*Schizoneura lanigera*, Hausm.). See Fig. 1, page 10. An insect which has been particularly abundant and much noticed by fruit growers from the conspicuous white colonies which have been seen on apple trees and hawthorns during the past season is the Woolly Aphis of the Apple. It is many years since this insect has appeared in the vast numbers that it was noticed in 1905. The injury, however, has not as yet been very great, and, since the root inhabiting form is seldom destructive in Canada, it is to be hoped that the abundant occurrence of the past season will not be attended by serious after consequences in our orchards. The attacks were largely upon nursery stock, and the colonies could doubtless have been destroyed by an application of kerosene emulsion or a whale-oil soap wash. As the colonies are so dense and frequently many of them are hidden inside an open swelling caused on the bark of young trees by their punctures, spraying the above insecticides would not in all cases reach all of the insects. Where possible, a more thorough application by means of a stiff brush would probably be more satisfactory. In very bad instances, however, twigs high up in the trees may be covered with the plant-lice, and in such cases the only practical treatment would be spraying with a strong kerosene emulsion (one to six), and the liquid must be applied with as much force as possible.

The Buffalo Tree-hopper (*Ceresa bubalus*, Fab.). This little homopter is often complained of for the injury done to young apple wood by the egg-laying females, which cut crescent-shaped slits in pairs along the young branches when depositing their eggs. These slits run deeply into the wood and leave lasting scars which give an ugly gnarled appearance to the trees. Injury is seldom severe; but a remarkable instance has occurred during the past summer in Mr. J. P. Gourdanier's magnificent seventy-acre orchard at Morven, Lennox county, Ont., where nearly all the trees were severely injured. The remedy usually recommended for this insect is to spray at the time the young hoppers hatch, with kerosene emulsion. In this case, however, spraying with crude oil or a strong kerosene emulsion just before the buds burst in spring would be advisable, so as to kill the eggs. It has been found that the young do not feed to any extent upon the apple trees after hatching; but upon weeds and other coarse vegetation near the ground. All such useless vegetation, therefore, should be kept closely mowed and the ground cultivated in infested orchards.

FOREST AND SHADE TREES.

Perhaps the most noticeable occurrences of insects upon forest trees during the past season were the reappearance of the Larch Sawfly and the remarkable increase in the numbers of the Spruce Gall-louse, *Chermes abietis*, L. This latter insect has been the cause of considerable anxiety among growers of ornamental spruces for some years. It undoubtedly renders the trees very unsightly and gives them an unhealthy appearance; but I know of no actual instance where it has killed trees. The young issue from the cone-like galls about the middle of August and crawl about on the trees, where later eggs are laid from which hatch young plant-lice that remain on the twigs until the following spring. Their presence in the young buds of the spruces causes slight swellings at the base of the leaves. Each female of the May brood lays about 300 eggs and the young from these, cluster in the swellings begun by their mothers, where they soon cause the galls which later are so conspicuous. No treatment is possible upon forest trees; but, upon hedges and ornamental specimen trees, good work has been done by spraying them at the times the young plant-lice are exposed and before they are enclosed in the galls, with a tobacco and soap wash, or with kerosene emulsion. The two seasons of the year when the young plant-lice may be reached are in the latter part of August and in May. A good soap wash may be made by soaking ten pounds of tobacco leaves in enough hot water to cover them. Then strain off the liquid and add two pounds of whale oil soap. When dissolved, dilute to forty gallons of water. Two or three applications of this spray should be made at short intervals.

The Tussock Moth has been fully treated in other parts of this report so requires no special mention here.

The Larch Case-bearer (*Coleophora laricella*, Hbn.). During the past summer the European larches on the Experimental Farm, at Ottawa, were seen to have many bleached leaves on some of their branches and upon close examination it was found that the leaves were being eaten by large numbers of the small European Elachistid, *Coleophora laricella*, Hbn. This had been recorded previously on larch trees in America; but I am not aware of its ever having been observed in Canada. The injury was not very severe, but every new importation of this nature is worthy of consideration, and it is to be hoped that this latest visitor may not be equally injurious here as it is in the German larch forests. The larval case is somewhat similar to that of the Cigar Case-bearer of the Apple, but is rather shorter and pale drab in colour. The caterpillars have a curious habit, when full grown and ready to pupate, of fastening themselves in the centre of a fascicle of leaves, where they are difficult to detect. There is only one brood in the year, the moths of which appear in June. They are very small, of a satiny ashy gray in colour, with long antennæ and very long fringes to the wings. After pairing, the females lay their tiny yellow eggs singly on the needles of the larch. These soon after hatch and the larvæ eat their way into the slender needles, of which subsequently they make a very slender case about one-eighth of an inch long, in which they pass the winter attached to the twigs of the tree. As soon as the young buds begin to swell in spring, these minute caterpillars revive and feed upon the young leaves. The presence of the caterpillars upon a tree is easily recognized by the condition of the leaves, the terminal portion of which is bleached and soon shrivels. When the caterpillar attacks a leaf it eats a hole in the side, and, as it consumes the interior portion, it protrudes its body until it can reach no further without leaving its case. The winter case soon becomes too small, when it is split down the side and the emptied skin of another leaf is inserted. The case in which the Larch Case-bearer passes the winter, is straight and slender, not curved as in the case of the Cigar Case-bearer No parasites were reared, and the young larvæ are to be found in large numbers on the trees this autumn.

ENTOMOLOGICAL RECORD, 1905.

By James Fletcher, Dominion Entomologist, Ottawa.

Although few of the correspondents mentioned in the last Entomological Record, to all of whom it was sent, have expressed an opinion of its utility, I learn indirectly that it is highly valued by entomologists as a means of learning what is being done in the country, where species have been taken by our collectors, where these live, and what orders they are specially interested in. Most of this evidence, however, has been given gratuitously by specialists living outside of Canada.

Up to the present time the Entomological Record has been sent regularly to every active collector known to me in Canada. In future it will be sent only to those who acknowledge its receipt.

From the large number of records sent in, it is evident that some of our collectors do not understand the objects of publishing this paper. These were stated in our first issue and repeated in 1902. There is no idea of publishing year after year long lists of insects which have been taken within their own range, but only such data as it is thought will be of value to students of geographical entomology and to those interested in life-histories, particularly the exact dates when various insects occur in the perfect state. It is hoped in this Record to publish a list of rare species or such as have not previously been noted as occurring in Canada; to give exact data as to the distribution of species together with dates when certain insects have been taken, so that localities may be visited and desirable species sought for at the time and place where they are known to have occurred; also to draw attention to works of particular value in the different departments of entomology, and to place on record anything which it is thought will encourage the study of insects in the Dominion.

A great many notes on captures have been sent in, and from these a selection has been made of such species as in the opinion of the writer or those specialists whom he has been able to consult, seemed worthy of recording. As in the past, great care has been exercised in endeavoring to arrive at correct determinations.

I have again to express great gratitude to the well-known specialists in the various orders who have so patiently identified large numbers of insects for Canadian collectors; and I am glad to know from these gentlemen that their own collections have been considerably enriched from the interesting northern and western Canadian material, much of which was unrepresented in the large collections of the United States. Particular mention in this direction must be made of Dr. J. B. Smith, of New Brunswick, N.J., who is untiring in his efforts to help all who apply to him. The same must be said of Prof. H. F. Wickham, of Iowa City, Iowa, Mr. W. D. Kearfott, of Montclair, N.J., and Dr. Skinner, of Philadelphia. Dr. L. O. Howard, U. S. Entomologist, and his expert associates, in the Bureau of Entomology, at Washington, have, as heretofore, given invaluable help in almost all orders of insects, to the many who have constantly asked for it.

The season of 1905 has been irregular, correspondents differing considerably in their opinion of it. On the whole, however, in most places it probably was a rather unproductive year. The cool nights and damp weather in many districts through the collecting season were very discouraging. Notwithstanding this, many good species were taken, and, as is always the case, energetic workers added many desirable species to their collections.

Among the important expeditions in our country, mention may be made of another extensive trip by Mrs. Nicholl, of Bridgend, South Wales, who again spent the summer in our Rocky Mountains and the mountains of Washington State, where she made large collections of butterflies and other insects. Another expedition of which up to the present time no report has been received, was made by Mr. J. Chester Bradley, of Ithaca, N.Y., together with a large party of naturalists, into the Selkirks, the mountains around Revelstoke and down the Columbia River. Mr. J. Keele, of the Geological Survey, Ottawa, brought back a small but most interesting collection of insects from the Yukon Territory. Among these were *Erebia Magdalena, Eurymus Boothii* and *Cœnonympha kodiak*—all insects of great rarity. Mr. W. J. Wilson, also of the Geological Survey, likewise made a collection of insects in the Hudson Bay country.

The collections of insects of our own Society at London, and those of the two Government institutions, viz., at the Central Experimental Farm, Ottawa, and at the Agricultural College, Guelph, have been materially increased during the past year; and it might be well for Canadian collectors to remember that there are a great many insects not represented in the cabinets of all these three institutions, and that specimens will always be acceptable.

Efforts are made to help applicants whenever possible with identifications, and the more complete these collections are, naturally of more use will they be to the whole country. We are glad to welcome Prof. Franklin Sherman, jr., at the Ontario Agricultural College at Guelph, and as his duties are more restricted than were those of his highly esteemed predecessor, Prof. W. Lochhead, we look for a rapid increase in the college collections. We would remind all our readers that as these Guelph collections, with the exception of Lepidoptera, are practically new ones, many species are entirely unrepresented, and, if properly labelled as to localities and dates, specimens in all orders taken in Ontario will be very acceptable to Prof. Sherman. Even unnamed material will be thankfully received.

Prof. Lochhead, who has done such good work at Guelph for many years, has severed his connection with the Agricultural College and has been appointed Biologist at the Macdonald College of Agriculture, Ste. Anne de Bellevue, Que. Doubtless he will soon make collections of insects for the Province of Quebec and will form at his College another centre for the accumulation and dissemination of knowledge concerning Canadian insects.

LITERATURE.

Biographical notes on entomology appear regularly in all the entomological journals and scientific magazines, such as the *Canadian Entomologist*, the *Ottawa Naturalist*, *Entomological News*, *Journal of the New York Entomological Society*, *Le Naturaliste Canadien*, and *Psyche*. These publications are indispensable to the working entomologist. Among the articles upon North American moths, Mr. Wolley Dod's series of papers in the *Canadian Entomologist*, giving critical notes on the Noctuids he has taken at Millarville and Calgary are of the greatest value to students of Western Canadian insects.

Among the books which have appeared during 1905, some are of special importance to Canadian students.

ALDRICH, J. M. A Catalogue of North American Diptera. Smithsonian Misc. Coll. XLVI., No. 1,444, 1905, pp. 680.—The latest catalogue of North American Diptera which has had to serve students until the present time was that by Baron Osten Sacken, published by the Smithsonian Institution in 1878. Many who would have taken up the study of flies have been prevented from doing so, for the lack of some systematic list by which they could arrange their collections. Prof. Aldrich has produced a most valuable contribution to entomology and there are few books which have appeared on this branch of science which have been so gladly welcomed as his catalogue. The work is done admirably and the greatest care has evidently been taken in searching literature and in verifying references. The references to Canadian publications are very complete and with this catalogue and the four Entomological Records which have appeared in our last four annual reports a check list of Canadian Diptera might now easily be made out. There has been an enormous increase in our knowledge of American flies during the last 27 years. In the present catalogue no less than 8,300 species are mentioned. The printing and general get-up of this work are as nearly perfect as can be. We congratulate the author in having finished so well this great work which has taken him seven years of patient labor.

COOK, Mel. T. The Insect Galls of Indiana (20th Annual Report Dept. Geology and Nat. Resources of Indiana, 1904, pp. 801 to 871).—We have received from Prof. Blatchley a separate copy of Mr. Cook's interesting and well illustrated pamphlet, which makes a fitting companion for Mr. Beutenmuller's bulletin on insect galls, noticed in our last issue. This will be found a useful help to those who are now taking up this attractive subject. Biographical references under the different species are a noticeable feature.

KELLOGG, Vernon L. American Insects. Henry Holt & Co., New York. Pages 674; 13 colored plates; figs. 812 in text.—Prof. Kellogg gives us in this work a useful addition to the books on general entomology which will be appreciated by beginners and will be found interesting to all who consult it. It is more popular and more up to date in many respects than the two standard works of a similar nature, Comstock's "Manual for the Study of Insects" and Packard's "Text-book of Entomology." The author states in the preface that "the book is written in the endeavor to foster an interest in insect biology on the part of students of natural history, of nature observers and of general readers, and does, as it professes, provide in a single volume a general systematic account of the principal American insects. Comstock's classification, which is now generally adopted by American teachers, is followed and synoptic tables are given which will be found very useful to students. The whole work shows evidence of the writer's original investigations, but naturally the specialist is more apparent in certain places than in others.

The physiology of insects, their relations to the development of plants and as carriers of disease, are treated of at greater length than is usual in such works, and form valuable contributions to the literature of these subjects. The printing, paper and general get-up of the book are excellent. The colored plates are good and will be found a great attraction to many who wish for such a work as a present for boys and girls. A few of the text figures are poor, and there are a few instances of errors as to the names of species represented. These, however, are minor faults which can be corrected by an "errata" slip or in a future edition.

HAMPSON, Sir George F. (Bart.). Catalogue of the Lepidoptera Phalænæ in the British Museum. Vol V. Noctuidæ, 1905, pp. 634, plates 78 to 95.—This volume is a continuation of Sir George Hampson's monographs of the moths of the world, and gives the classification of the subfamily Hadeninæ as he understands it. "The subfamily is characterized by its trifid neuration of the hind wing combined with the hairy clothing of the eyes and forms an extremely natural and well-marked group of species." The generic names used will be found unfamiliar to American students. The old genus *Mamestra* is now included in *Polia*. Many species recognized in our lists are included as synonyms of other species. Possibly, however, larger series of specimens would enable the eminent author to change his judgment on some of these. The specific limits of many insects can only be decided after careful breeding from the egg, a class of work which is now receiving great attention in this country, and of which much is still to be done for many North American species. Some of the Canadian localities given are very vague and give little information as to distribution. The figures in the plates are for the most part excellent and about 160 species are shown which have already been or are likely to be found in the Dominion. It is noticeable what good work has been done by Mr. F H. Wolley-Dod in supplying Sir George Hampson with specimens.

OSBORN, Herbert. Jassidæ of New York State. (20th Report of the State Entomologist of New York, pp. 498-545.—This comprehensive list of the Jassidæ of New York is of special interest to hemipterists in Eastern Canada, as all the 175 specimens mentioned may be expected to occur with us. Prof. Osborn has for many years made a special study of the Jassidæ, so is well fitted to prepare this list. It is printed on good paper and in the admirable manner characteristic of Dr. Felt's reports. It contains copious bibliographical references and is carefully indexed in the general index to the Entomologist's report.

Skinner, Henry (M.D.). Synonymic Catalogue of North American Rhopalocera, Supplement No. 1.—A supplement to Dr. Skinner's Catalogue of 1898, giving references to the literature of the subject up to the end of 1904. This will be found a most useful help to students of North American diurnals and shows that a great deal of attention has recently been given to these attractive insects. No working entomologist can do without this supplement. Dr. Skinner's well recognized knowledge of North American diurnals makes his critical notes a valuable feature of the pamphlet, which is printed in the same neat and convenient style as the original catalogue. The genera, we are glad to see, appear under the same names as before, which seems preferable for the present at any rate.

Smith, J. B. (Sc.D.). Reports upon the Mosquitoes occurring within the State of New Jersey, their habits, life history, etc. Trenton, N.J., 1904, pp. 482.—Copiously illustrated with numerous figures and plates. No index. Many books and pamphlets have recently appeared upon mosquitoes and the mosquito question, but none, we think, so complete or of such general utility as this extensive report. The work has been done thoroughly, as all of Prof. Smith's work is, and his results are presented in a readable and intelligible manner, which must make the report very satisfactory to the people of the State of New Jersey, who provided the necessary funds for the large amount of work which was necessary in carrying out the experiments in draining large marshes, making of surveys, etc., as well as for the scientific biological work carried on in the laboratory. The report is well arranged. Part I. treats of mosquito characteristics and habits; Part II., checks and remedies; Part III., classification and descriptions; Part IV., local problems and surveys. Parts I. and III. will be of greatest interest to the systematic entomologist, no less than 37 species of New Jersey mosquitoes are described and fully illustrated. The whole work shows the capability of the author in carrying to a successful issue a work of great magnitude and also one demanding great scientific knowledge.

Van Duzee, E. P. List of Hemiptera taken in the Adirondack Mountains. (20th Report of the State Entomologist of New York, pp. 546-556.) Although less complete than Prof. Osborn's list of Jassidæ of New York, the present paper will be found to be of great value to Canadian students on account of the similarity of the fauna treated of and that of vast and varying areas in Canada. It is a most welcome addition to the literature of an order which requires many more students than so far have given their attention to it. Mr. Wm. Metcalfe of Ottawa has shown what good work may be done even in a restricted locality by an energetic collector.

Wright, W. G., The Butterflies of the West Coast of the United States. (The Wittaker & Ray Company, San Francisco, pp. 257, 31 plates, color photography (940 figures).—This handsome work, which has just come to hand, is uniform in size, style, paper and print with Dr. Holland's Butterfly Book, and the plates are equally beautiful in execution and are superior in the important feature that many more undersides are shown, particularly among the Argynnidæ and Lycænidæ, where this is of so much importance. Mr. Wright's name is so well known as a collaborator of Mr. W. H. Edwards that his work will be read with great interest by all the older students, although perhaps younger men will not altogether approve of the generic classification adopted. This, however, is, as the author points out, not a matter of very much moment so long as the specific names remain constant. He naively says: "Students should bear in mind that the species is the foundation. Genus and family names are more or less arbitrary. . . . When looking up a butterfly in the index, look for the specific name rather than the genus or family name, because these latter names are found in all sorts of queer places, according to the fancy of the man who writes the list."

The first chapter, "General Features of Butterfly Life," consists of short essays giving the author's views on many subjects which will be read with interest, but with some of which lepidopterists will not agree. They are valuable as being founded on the author's personal experience and observation of the species treated, mostly in California. A complete list of the butterflies of the United States gives the names as classified by Mr. W. H. Edwards with the date of the original description. The names of the Pacific coast species are in full-faced type and the descriptions are numbered in the body of the book the same as the figure on the plates, which makes them very easy of reference. The points of difference between allied species are original, and coming from one with such long experience with the species mentioned will be very useful. This work will be of great value to our collectors in British Columbia, where many of the California species occur; but *Thecla blenina* and *T. spinetorum*, two species which probably they will first look for, will be a disappointment. The former, although referred to in the Index, is neither figured nor described, and *spinetorum* as figured is neither the insect which occurs in collections under that name, nor the closely allied *T. Johnsonii*, of Skinner. Our Vancouver Island friends will read with much amusement the description of their climate given under *Chionobas gigas*. Mr. Wright visited Mount Finlayson on July 3, 1891, for eggs of *C. gigas*. He says: "The males stay about the bare rock-knobs, flirting and playing during the few sunny hours that shine upon the rocks in that cloudy, raw climate." *C. gigas* and *nevadensis* are treated as different species, the latter being considered as more nearly related to *californica*.

The following is a list of the full names and addresses of the collectors referred to in the "Notes of Captures" for 1905:—

Anderson, E. M., Victoria, B.C.
Baldwin, J. W., Ottawa.
Bethune, Rev. C. J. S., London, Ont.
Bryant, Theodore, Wellington, B.C.
Bush. A. H., Vancouver, B.C.
Chagnon, Gus., Montreal.
Cockle, J. W., Kalso, B.C.
Criddle, Norman, Aweme, Man.
Dod, F. H. Wolley-, Millarville, Alta.
Draper, R., Vancouver, B.C.
Evans, J. D., Trenton, Ont.
Fletcher, Dr. James, Ottawa.
Fyles, Rev. T. W., Levis, Que.
Gibbon, Hugh, Miniota, Man.
Gibson, Arthur, Ottawa.
Grant, C. E., Orillia, Ont.
Hanham, A. W., Victoria, B.C.
Harrington, W. H., Ottawa.
Harvey, R. V., Vancouver, B.C.
Heath, E. F., Cartwright, Man.
Hudson, A. F., Millarville, Alta.
Jones, W. A. Dashwood, New Westminster, B.C.
Keen, Rev. J. H., Metlakatlah, B.C.
Keele, Jos., Ottawa.
Lyman, H. H., Montreal.
Marmont, L. E., Rounthwaite, Man.
Metcalfe, W., Ottawa.
Moore, W. H., Scotch Lake, N.B.
Perrin, Jos., McNab's Island, Halifax, N.S.
Sanson, N. B., Banff, Alta.
Taylor, Rev. G. W., Wellington, B.C.
Venables, E. P., Vernon, B.C.
Walker, Dr. E. M., Toronto.
Willing, T. N., Regina, N.W.T.
Wilson, W. J., Ottawa.
Young, C. H., Hurdman's Bridge, Ont.

NOTES OF CAPTURES.

LEPIDOPTERA.

(Arranged according to Dyar's List of North American Lepidoptera, U. S. N. M. Bull. No. 52.)

RHOPALOCERA.

(Dyar's number).

21. *Papilio brevicauda*, Saunders. Larva found at the North-west River Post of the Hudson Bay Co., on Lake Melville, Ungava, (Lyman).

37. *Pontia protodice*, Bdv. & Lec. Second specimen taken at Ottawa, September 27, (Gibson).

41. *Nathalis iole*, Bdv. Perfect female taken Sept. 29 at Rounthwaite, Man., by Mrs. L. E. Marmont. A specimen of this insect was also taken at Cartwright, about 50 miles S. E. of Rounthwaite by Mr. Heath, about 20 years ago.

64. *Eurymus Boothii*, Curtis. Lansing River, Yukon Territory, June 24, Leduc River, Y. T., July 4, (Keele). Two fine males.

65. *Eurymus eurytheme*, Bdv., b. *eriphyle*, Edw. Millarville, Alta. Nov. 17; female quite fresh and very small, evidently of a third brood; a most exceptional record, (Dod).

74. *Eurymus palæno*, L. Leduc River, Y. T., July 4; Stewart River, above Boswell, Y. T., 2 males; Fraser Falls, Y. T., (Keele).

92. *Euptoieta claudia*, Cram. Baltimore, Ont. Larvæ in dozens destroying pansies, July 11, (T. M. Wood).

98. *Argynnis leto*, Behr. McLeod, Alta. July 3, 1904, (Willing).

119. *Argynnis Edwardsii*, Reakirt. Alameda, N. W. T., June 19, 1900, (Fletcher).

Phyciodes Hanhami, Fletcher. Rounthwaite, Man., July 7, Marmont.

194. *Phyciodes Barnesi*, Skinner. Okanagan valley, 1895, (C. deB. Green); Mr. E. M. Anderson, of Victoria, B. C., has shown me some specimens so named by Dr. Dyar; and, having examined into the matter, I have no doubt that what in the past I have been naming for correspondents as *P. mylitta*, Edw. is *Barnesi*, Skin., which was described by Dr. Skinner for this similar but much larger species. I have specimens of true *mylitta* which were taken at Agassiz and Mission in the Fraser valley, B. C., but had considered them as merely dwarfs of the form which has since been described as *Barnesi*. The males of the two species are much alike. Both are figured in Holland's Butterfly Book.

209. *Polygonia faunus*, Edw. Scotch Lake, N. B., (Moore). This fine Grapta was remarkably abundant all through Canada this season. As a rule, it is one of the rarest of the genus, notwithstanding its wide range.

216. *Eugonia californica*, Bdv. Rounthwaite, August 30, (Marmont).

270. *Erebia disa*, Thun., a. *mancinus*, D. & H. Lansing River, Y. T., June 24, (Keele).

275. *Erebia magdalena*, Strk. On mountain 12 miles up Hell River, Y. T., August 2, (Keele). A very rare insect.

282. *Cœnonympha kodiak*, Edw. Lansing River, Y. T., June 24, Leduc River, Y. T., July 4, (Keele): Atlin, B. C., (sent by T. Bryant).

286. *Enodia portlandia*, Fab. MacNab's Island, Halifax, N. S., (Perrin): Cartwright, Man., July 16 & 22, first time there. (Heath).

292. *Œneis jutta*, Hbn. North Fork, Stewart River, Y. T., June 22; Lansing River, Y. T., June 24; Leduc River, Y. T., July 4, (Keele).

Thecla Johnsoni, Skinner. Vancouver, B.C., end of May, (Draper); Stanley Park, Vancouver, June 9, 6 sp., (Harvey).

472. *Ancyloxypha numitor*, Fab. Orillia, Ont., Plentiful, never taken here before, (Grant).

490. *Erynnis pawnee*, Dodge. Rounthwaite, August 10, (Marmont).

504. *Anthomaster leonardus*, Harr. Ottawa, Sept. 1904, (Mrs. Nicholl); Britannia, Ottawa, August 23, 1904, (Baldwin). This has been very rare at Ottawa up to the present time; not taken for 25 years.

555. *Limochroes bimacula*, G. & R. London, Ont., (Bethune).

HETEROCERA.

657. *Lepisesia flavofasciata*, Wlk., a. *ulalume*, Strk. Evidently remarkably abundant this year at Vancouver, where many specimens were taken by Bush, Draper, Harvey and Jones. Mr. Cockle also caught the species at Kaslo and secured eggs for rearing.

659. *Lepisesia clarkiæ*, Bdv. Victoria, B. C., May 17, 25, 27, (Anderson).

701. *Sphinx drupiferarum*, S. & A. Kaslo, June 30, (Cockle); bred from larvæ which were abundant in orchards last year, Vernon, B. C., (Venables).

705. *Sphinx Vancouverensis*, Hy. Ed. Wellington, B. C., May 30, (Taylor).

836. *Utetheisa bella*, L. Ottawa, Sept. 25, (Fletcher). The second specimen seen at Ottawa, the other one being taken Sept. 20, 1877.

861. *Phragmatobia assimilans*, Wlk., a. *franconica*, Slosson. Ottawa, June 3, 1899, (Gibson); Meach Lake, Que., May 16 & 17, (Young).

875. *Apantesis virguncula*, Kirby. Ottawa, July 6, (Baldwin). A rare species at Ottawa.

880. *Apantesis anna*, Grt., a. *persephone*, Grt. Trenton, June 17, (Evans).

880. *Apantesis nevadensis*, G. & R. a. *incorrupta*, Hy. Edw. Fine specimens reared at Ottawa by Mr. Gibson from larvæ collected by Mr. Marmont, at Rounthwaite, Man.

891. *Apantesis celia*, Saunders. Ottawa, pupa May 9, imago June 7, (Baldwin).

895. *Apantesis vittata, Fab.* Ottawa, pupa May 1, imago May 26, (Baldwin).

895. *Apantesis vittata*, Fab., b. *phalerata*, Harr. Trenton, June 20, (Evans). I doubt very much that this is a variety of *vittata*.

982. *Apatela leporina*, L., var. *mœsta*, Dyar. Kaslo,, June 1 at sugar, (Cockle).

994. *Apatela furcifera*, Gn. *Aweme*, Man., June 6, 29, common at sugar, (Criddle).

1,000. *Apatela quadrata*, Grote. Miniota, Man., June 28, 1904, (Gibbon).

1,004. *Apatela superans*, Gn. Aweme, June 12, one specimen, first time taken here, (Criddle).

1,015. *Apatela mansueta*, Sm. Kaslo, one specimen at sugar, July 1, (Cockle).

1,075. *Baileya Doubledayi*, Gn. Hull, Que., June 3, (Gibson).

1,176. *Hadena didonea*, Sm. Ottawa, bred from larvæ boring in root shoots of *Phalaris arundinacea*, June 26, (Fletcher).

1212. *Hadena passer*, Sm. Regina, N.W.T., July 15, (Fletcher).

Hadena exhausta, Sm. Cartwright, (Heath).

1,221. *Hadena apamiformis*, Gn. Ottawa, June 28, (Gibson).

1,247. *Hadena cinefacta*, Grt. Regina, June 11, 30; July 3, 14, (Willing); Victoria, May 12, (Anderson).

1,273. *Polia contadina*, Sm. Victoria, Sept. 12, (Anderson).

1,281. *Hyppa brunneicrista*, Sm. Victoria, June 6, first one taken for 4 or 5 years, (Anderson).

1,302. *Laphygma frugiperda*, S. and A. Cartwright, Sept. 29, always scarce, (Heath). Aweme, Sept. 16, (Criddle).

1,312. *Homohadena badistriga*, Grt., var. *fifia*, Dyar. Yorkton, N.W.T., July 28, (Willing); Aweme, July 10, Aug. 3 and 12, (Criddle).

1,333. *Oncocnemis Saundersiana*, Grt. Aweme, Sept. 9, at light, (Criddle). Very rare in collections.

1,344. *Oncocnemis iricolor*, Sm. Aweme, Sept. 1, at light, (Criddle). A very rare species.

1,358. *Oncocnemis cibalis*, Grt. Millarville, Alta., Aug. 27, at light, not seen for years, (Hudson).

1,354. *Oncocnemis viriditincta*, Sm. Aweme, Aug. 22 and 31, at light, (Criddle).

1,370. *Adita chionanthi*, S. and A. Cartwright, one specimen, Aug. 19, first specimen appeared here about five years ago, (Heath).

Rhynchagrotis scopeops, Dyar. Kaslo, Aug. 26, at sugar, (Cockle).

Aplectoides discolor, Sm. (Jl. N. Y. Ent. Soc., Dec., 1905.) Mouth of Skeena River, June 29. Inverness, B.C., July 16, (Keen).

1,392. *Rhynchagrotis minimalis*, Grt. Kaslo, July 20-29, at sugar, (Cockle).

1,426. *Semiophora elimata*, Gn. Kaslo, Aug. 17, (Cockle); Meach Lake, Que., May 8, (Young).

1,427. *Semiophora opacifrons*, Grt. Meach Lake, Que., Aug. 7, (Young).

1,450. *Setagrotis infimatis*, Grt. Kaslo, Aug. 7, one specimen with a pink suffusion on upper side of primaries, Aug. 11, (Cockle).

1,453. *Agrotis aurulenta*, Sm. Aweme, June 16, 1904, (Criddle). A new locality for the species.

Noctua acarnea, Sm. (Jl. N. Y. Ent. Soc., Dec., 1905.) Banff, Alta., July 11, 1902, (Sanson).

1,498. *Noctua pyrophiloides*, Harvey. Kaslo, Aug. 3 and 20, at light, (Cockle).

1,500. *Noctua havilæ*, Grt. Cardston, Alta., June 21, 1902, (Fletcher).

1,506. *Noctua substrigata*, Sm. Rounthwaite, July 20, (Marmont).

Feltia obliqua, Sm. Millarville, May 25, at light, (Dod).

1,588. *Paragrotis brocha*, Morr. Vernon, Aug., (Venables).

1,590. *Paragrotis cogitans*, Sm. Millarville, Aug. 10, at light. One male only previously taken, (Hudson).

1,623. *Paragrotis detersa*, Wlk. Larva found at Youghall, N.B., on saltwort, *Salsola kali*. Very much like that of *Paragrotis scandens*, Riley. Moth emerged at Ottawa, Sept. 6, (Fletcher).

1,660. *Paragrotis incallida*, Sm. Millarville, Aug. 27, (Hudson); July 21, very rare of recent years, (Dod).

1,693. *Paragrotis mollis*, Wlk. Millarville, at light, July 30, a great rarity, (Hudson).

Paragrotis nesilens, Sm. Cartwright, July 3, (Heath); Aweme, July 10, (Criddle); Millarville, July 17, Aug. 25, at light, (Hudson).

Paragrotis maimes, Sm. Cartwright, one at sugar, Sept. 4, always a rarity, (Heath); Millarville, Aug. 12 and 27, (Hudson). This is the species previously known in Canada as *Ridingsiana*, Grt., which, however, is a southern species.

1,731. *Paragrotis acutifrons*, Sm. Cartwright, at sugar, a single specimen, (Heath).

1,732. *Paragrotis nordica*, Sm. Millarville, at light, July 28, (Hudson).

1,881. *Barathra occidentata*, Grt. Abundant from middle of June to 1st of July at Ottawa, (Young, Gibson, Baldwin, Fletcher). Specimens also sent from Nova Scotia, (Dr. C. A. Hamilton), Quebec, (Fyles), and also found at Nepigon.

1,885. *Morrisonia sectilis*, Gn., a. *vomerina*, Grt. Toronto, May 9, 1898, (Gibson); Aweme, May 16, (Criddle).

1,910. *Scotogramma uniformis*, Sm. Kaslo, at light, Aug. 8, (Cockle).

1,953. *Heliophila unipuncta*, Haw. Wellington, B.C., March 2, (Bryant).

2,026. *Graphiphora peredia*, Grt. Cartwright, at sugar, Aug. 8, several subsequently, (Heath).

2,096. *Xylina amanda*, Sm. Cartwright, at sugar, Aug. 31, (Heath).

Xylina ancilla, Sm. Cartwright, at sugar, Aug. 31, Sept. 3, (Heath).

2,142. *Rancora strigata*, Sm. Vernon, Ap. 5, (Venables).

2,175. *Papaipema Harrisii*, Grt. Bred from *Heracleum lanatum* on the Restigouche River, N.B., (Lyman); Cartwright, one specimen, (Heath).

2,179. *Papaipema nitela*, Gn. Fargo, Ont. Although frequently recorded from Canada as a pest on potatoes and corn, these are the first specimens I have actually seen. Most of the previous records referred to *P. cataphracta*. Larvæ buried at Ottawa, Aug. 2, and moths appeared Sept. 6. (Fletcher.)

Papaipema thalictri, Lyman, var. *perobsoleta*, Lyman. Bred from roots of *Thalictrum cornuti* at Montreal West, (Lyman).

2,180. *Papaipema nelita*, Strk. Cartwright, one at light, (Heath).

2,184. *Papaipema frigida*, Sm. Cartwright, at light, Aug. 8. This is a rarity and is somewhat like a large *nelita*, (Heath.)

2,205. *Conservula anodonta*, Gn. Meach Lake, Que., July 12, (Young).

2,288. *Nycterophœta luna*, Morr. Rounthwaite, May 25, 1901, (Marmont); Millarville, July 6, asleep on thistle head in sunshine, open prairie near Red Deer River, 50 miles north-east of Gleichen, (Dod). Mr. Marmont's record was sent in in 1901 but was accidentally overlooked.

Melicleptria sexata, Sm. Aweme, July 21, (Criddle).

2,473. *Polychrysia formosa*, Grt. Meach Lake, Que., Aug. 15, (Young).

2,494. *Autographa rubidus*, Ottol. Meach Lake, Que., June 5, (Young).

2,496. *Autographa brassicæ*, Riley. Kaslo, common, (Cockle); Vancouver, June 14, (Anderson); Ottawa, Aug. 16, (Gibson); Rounthwaite, common, Marmont).

2,551. *Marasmalus inficita*, Wlk. Orillia, at light, (Grant); Montreal, July 1, (Chagnon).

2,555. *Alabama argillacea*, Hbn. Cartwright, Sept. 1, (Heath); Levis, Que., (Fyles). The Cotton Moth was abundant in many places in eastern Canada for a few days in the beginning of Sept., but not in such numbers as it sometimes appears.

2,623. *Prothymia rhodarialis*, Wlk. Orillia, at light, (Grant).

2,766. *Melipotis fasciolaris*, Hbn. Ottawa, at rest in yard, July 6, (Baldwin). A remarkable capture. The species is a native of the West Indies and was probably brought in with bananas. The Ottawa Fruit Exchange building is close to Mr. Baldwin's house.

2,788. *Syneda ochracea*, Behr. Vernon, June, (Venables).

2,844. *Catocala augusta*, Hy. Edw. Kaslo, (Cockle).

2,858. *Catocala coccinata*, Grt. Cartwright, two or three each year. This is much smaller than *parta*, though like it at first sight, (Heath).

Bomolocha lutalba, Sm. Cartwright, July 10, (Heath).

3,072. *Bomolocha toreuta*, Grt. Aweme, June 18, (Criddle).

3,128. *Dasylophia thyatiroides*, Wlk. Ottawa, June 24, (Young); Toronto, June 6, (Gibson).

3,147. *Ianassa pallida*, Strk. Kaslo, Aug. 3, (Cockle).

3,211. *Tolype laricis*, Fitch. Orillia, two specimens at light, (Grant).

3,226. *Oreta rosea*, Wlk. St. John's, Que., July 29, (Chagnon). The larva feeds on *Viburnum cassinoides* in peat bogs.

6,606. *Sthenopis thule*, Strk. Ottawa, July 6, (Gibson). This is the only specimen so far known with certainty to have been taken at any other place than Montreal. Mr. Gibson also saw two more specimens the following evening; but, although sought for carefully then and for several days afterwards, no others were seen.

6,608. *Hepialus hyperboreus*, Moesch. Kaslo, one specimen, bright reddish orange, no silver, (Cockle).

COLEOPTERA.

(Arranged according to Henshaw's List of the Coleoptera of America, North of Mexico.

25f. *Cicindela limbalis*, Kl. Calgary, May 17, (Willing).

34. *Cincindela pusilla*, Say. Rounthwaite, Man., Aug. 24, (Marmont), Vernon, B.C., an almost immaculate specimen, (Venables); Okanagan Falls, B.C., July 20, 1895, (Fletcher).

156. *Elaphrus Lecontei*, Crotch. Olds, Alta., June, (Willing).

184. *Nebria diversa*, Lec. Albert Head, Vancouver Island, B.C., Aug. 1, under drift among sand dunes, very active and pale in color like the sand, (Hanham).

1,216. *Amphizoa Lecontei*, Matth. Vernon, (Venables). Quite a rare species, but known from several places in the Rocky Mountain system (Wickham.)

1,696. *Necrophorus Sayi*, Lap. Montreal, Sept. 27, at light, (Chagnon).

1,707. *Silpha trituberculata*, Kirby. Tofield, Alta., July 27, (Willing).

2,180. *Philonthus discoideus*, Gray. Trenton, Aug. 20, (Evans); Ottawa, one specimen, (Harrington).

2,115. *Quedius vernix*, Lec. Montreal, under dead leaves, Sept. 2, (Chagnon).

2,128. *Staphylinus erythropterus*, L. Ottawa, flying, May 4, (Gibson). This rare and beautiful species resembles *badipes*, but has red elytra and two rows of golden spots, one down each side of dorsum.

2,434. *Stenus croceatus*, Casey. Trenton, Sept. 17, (Evans); Ottawa, Oct. 10, (Harrington).

2,825. *Lathrimæum pictum*, Fauv. Goldstream, B.C., abundant in Skunk cabbage, *Lysichiton*, early in the season, (Hanham).

2,854. *Homalium rufipes*, Fauv. Trenton, May 15, (Evans).

3,043a. *Hippodamia mœsta*, Lec. Goldstream, Victoria, a late summer species, rare, found on thistles, etc., (Hanham).

3,118. *Hyperaspis postica*, Lec. Goldstream, by sweeping, August, (Hanham). Described from California.

3,168. *Scymnus Phelpsii*, Cr. Victoria, on fences, Sept., (Hanham).

3,179. *Phymaphora pulchella*, Newm. Montreal, on dead birch partly covered with fungi, Sept. 29, (Chagnon).

3,223. *Mycotretus pulchra*, Say. Trenton, Aug. 26, (Evans). Rare at Ottawa in fungus.

3,403. *Triphyllus elongatus*, Lec. Goldstream, early summer, (Hanham).

3,505. *Hister sedecimstriatus*, Say. Montreal, in cow dung, June 15, (Chagnon).

3,971. *Macropogon testaceipennis*, Mots. Goldstream, June 28, beaten off *Arbutus Menziesii* only; rare, (Hanham).

3,984. *Aræopus monachus*, Lec. Vernon, (Venables).

3,993. *Eucinetus terminalis*, Lec. Montreal, from sweepings in marshy land, Sept. 21, (Chagnon).

4,083. *Adelocera profusa*, Canad. Vernon, under pine bark, May, (Venables).

4,218. *Elater nigrinus*, Payk. Trenton, June 20, (Evans).

4,224. *Elater vitiosus*, Lec. St. Hilaire, Que., July 1, (Chagnon); Ottawa, one specimen, (Harrington).

4,247. *Elater obliquus*, Say. Trenton, June 30, (Evans).

4,343. *Melanotus sagittarius*, Lec. Montreal, May 4, (Chagnon); Ottawa, one specimen, in spring, (Harrington).

4,369. *Limonius subauratus*, Lec. Vancouver, May 16, (Harvey).

4,382. *Pityobius anguinus*, Lec. Six specimens of this fine elater were taken at electric light, Ottawa, June 28, (Gibson and Baldwin).

4,474. *Corymbites sagitticollis*, Esp. Vancouver, May 16, (Harvey).

4,498. *Corymbites rotundicollis*, Say. Specimens of the Pacific form that passes by this name were taken by Mr. Hanham at sugar and on fences. (Wickham.)

4,587. *Dicerca sexualis*, Cr. Vancouver, June 20, (Harvey).

4,738. *Agrilus acutipennis*, Mann. St. John's, Que., June 25, (Chagnon).

4,836. *Photinus marginellus*, Lec. Rare at Ottawa, (Harrington); Trenton, Aug. 8, (Evans).

5,020. *Endeodes collaris*, Lec. Albert Head, Victoria, Aug. 3, on sandy beach under moist seaweed, (Hanham); all of our species of *Endeodes* are found in such locations along the Pacific coast and are remarkable for their curious short elytra. (Wickham.)

5,164. *Clerus spinolæ*, Lec. Victoria, (Anderson).

5,177. *Clerus nigriventris*, Lec. Vernon, (Venables).

5,356. *Amphicerus bicaudatus*, Say. Regina, Oct. 6, 1900, (Willing).

Donoderus pacificus, Casey. Banff, Alta., July 13, (Willing).

5,432. *Canthon simplex*. Lec. Vernon, (Harvey).

5,439. *Onthophagus janus*, Panz. Trenton, May 9, (Evans).

5,557. *Aphodius scabiceps*, Lec. Aweme, Sept. 19, (Criddle). Described from Colorado and so far not reported from any other locality. (Wickham.)

5,659. *Dichelonycha testacea*, Kirby. Saltcoats, N.W.T., July 12, (Willing).

6,233. *Centrodera decolorata*, Harr. Montreal, June 14, at light, (Chagnon).

6,428. *Liopus fascicularis*, Harr. Trenton, July 9, rare, (Evans).

6,478. *Saperda calcarata,* Say, var. *adspersa,* Lec. St. John's, Que., Aug. 27, (Chagnon).

6,560 (10,337). *Syneta hamata,* Horn. Vernon, May, (Venables).

6,599. *Saxinis saucia,* Lec. Vernon, (Venables).

6,959. *Disonycha rufa,* Ill. St. Hilaire, Que., on willows, June 28, (Chagnon).

7,303. *Cœlus ciliatus,* Esch. Victoria. Prof. Wickham so names the species I recorded as *globosus* in last Ent. Record. (Hanham.)

7,396. *Cœlocnemis dilaticollis,* Mann. Goldstream. This is our largest Tenebrionid. It ocurs rarely on dry hillsides under logs, etc., August and later, (Hanham).

7,484. *Uloma longula,* Lec. Goldstream, July, under bark of fallen Douglas fir, (Hanham).

7,666. *Serropalpus barbatus,* Schall. Oak Bay, Victoria, B.C., Sept. 1, at sugar, (Hanham).

7,724. *Calopus augustus,* Lec. Enderby, B.C., April, (Venables).

7,729. *Ditylus gracilis,* Lec. Vancouver, (Harvey).

Xanthochroa testacea, Horn. Albert Head, beaten from *Spiræa,* July 31, (Hanham). As yet this Œdemerid is rare in collections. (Wickham.)

7,872. *Eurygenius campanulatus,* Lec. Goldstream, June, only taken on the ground in cultivated fields, (Hanham).

7,874. *Stereopalpus vestitus,* Say (*badiipennis,* Lec.). Sandhills near the big Douglas swamp, Manitoba, June, (Hanham).

8,240. *Trigonoscuta pilosa,* Mots. Victoria, among roots on sea beach, one pair, (Hanham). Not uncommon further south, but this Vancouver Island record is of interest. (Wickham.)

8,270. *Amnesia decorata,* Lec. Goldstream, occasional under stones, (Hanham).

8,349. *Sitones crinitus,* Gyll. (following LeConte). Olds, June 5, (Willing).

8,357. *Trichalophus simplex,* Lec. Regina, July and August, (Willing).

8,526. *Cleonus vittatus,* Kirby. Victoria, one pair, (Hanham). Uncommon so far north. (Wickham.)

8.641. *Anthonomus sycophanta,* Kirby. Olds, in a gall on willow, Sept. 5, (Willing). Occurs from New Hampshire to District of Columbia, from Oregon to Southern California. (Wickham.)

8,687. *Proctorus armatus,* Lec. North of Olds, June. Prof. Wickham says this is very rare in collections, (Willing).

9,207. *Allandrus bifasciatus,* Lec. Abernethy, N.W.T., June 28, (Willing).

ORTHOPTERA.

Some collections have been made of Orthoptera, but even yet this important field for good work is almost untouched. Dr. Walker, of Toronto, has been in Europe during the greater part of the past collecting season; but one or two other students have taken up the study, and it is probable that next year will show a considerable advance in our knowledge of Canadian locusts and their allies. The following records of species of some interest have been received:—

Ageneotettix Scudderii, Brun. Aweme, Aug. 1, (Criddle).

Amphitornus bicolor, Thom. Aweme, July 21, Aug. 1, (Criddle).

Arphia pseudonietana, Thom. Aug. 12, Vernon, (Venables).

Chloealtis conspersa, Harr. This is *conspersa,* but is colored like the western *abdominalis.* The sides of the pronotum are not shining black as in all the specimens of *conspersa* I have seen before, but are dark only in the upper half as in *abdominalis*. The latter is a Rocky Mountain form which I have taken at Banff and in Manitoba, and also along the Severn River, Ont. (Walker.) The above specimens were taken on Anticosti Island by Dr. J. Schmitt in 1903.

Chloealtis conspersa, Harr., var. *prima*, Morse. Grimsby, Ont., Aug. 22, 1904, (Metcalfe), also recorded from Lake Simcoe by Walker. (A. N. Caudell.)

Conocephalus nebrascensis, Brun. Grimsby, Aug. 12, Sept. 3, 1894, (Metcalfe).

Cordillacris cinerea, Brun. Aweme, July 7, Aug. 8, (Criddle).

Gomphocerus clavatus, Thom. New Lunnon, Alta., July 22, (Fletcher); Aweme, (Criddle).

Hippiscus latifasciatus, Scudd. Aweme, June 15, (Criddle).

Hippiscus tigrinus, Scudd. Aweme, May 25, (Criddle).

Mecostethus gracilis, Scudd. New Lunnon, Alta., July 27, (Fletcher); Aweme, Sept. 6, (Criddle).

Mecostethus lineatus, Scudd. Anticosti Island, (Dr. Schmitt). Male and female. These differ from Ontario specimens in having a dark ring on the hind tibiæ near the base, and in the shorter tegmina and wings; the female also differs in the pronotum, which is more contracted before the middle. (E. M. Walker.)

Melanoplus bilituratus, Walk. Aweme, July 4, (Fletcher and Criddle).

Melanoplus Dawsoni tellustris, Scudd. Aweme, (Criddle).

Melanoplus extremus junius, Dodge. Aweme, July 7, (Criddle and Fletcher).

Melanoplus fasciatus volaticus, Scudd. Edmonton, Alta., (Fletcher).

Nemobius griseus, Walk. Toronto, Oct. 8, 1903, (Metcalfe).

Spharagemon Bolli, Scudd. Aweme, July 27, (Criddle).

Stenobothrus acutus, Morse. Edmonton, Alta., (Fletcher).

Stirapleura decussata, Scudd. Aweme, May 24, (Criddle).

Tettix ornatus triangularis, Scudd. Toronto, April 4, 1904, (Metcalfe).

Trimerotropis citrina, Scudd. Vernon, B.C., Aug. 25, (Venables).

ODONATA.

This order has not yet received from Canadian entomologists the attention which it deserves; but an effort will be made to draw more attention to it, as there are doubtless a great many interesting species in Canada which have not yet been recorded. The few collections which have been submitted to specialists, have all contained species of interest, and this attractive order presents a field well worthy of study. The life-histories of many species are unknown, and the habits of the larvæ of all make them very desirable objects for an aquarium. Dr. E. M. Walker, of Toronto, has collected for some time and has now a collection of about 65 species found in Ontario. He has kindly named any specimens I have submitted to him, and the following notes are made from letters which he has written. The species mentioned are the most interesting of a large number which have been submitted to him or which he has taken himself recently.

Calopteryx æquabilis, Say. Algonquin Park, Ont., July 25, 1900, (Prof. John Macoun). The same locality, Aug. 31, 1902, (Dr. E. M. Walker).

Ophiogomphus rupinsulensis, Walsh. North River, Algonquin Park, Aug. 13 to 30, 1902-03, (Walker).

Hagenius brevistylus, Selys. Lake Simcoe, July, Algonquin Park, Aug. 20, (Walker).

Lanthus albistylus, Selys. North River, Algonquin Park, Aug. 14, (Walker).

Somatochlora forcipata, Scudd. A very rare and interesting species of northern range. One male, Algonquin Park, July 15, (Macoun); Isle of Orleans, Que., Aug. 30, (Walker).

Gomphus Scudderi, Selys. North River, Algonquin Park, Aug. 20, 1903; Aug. 30, 1902, (Walker).

Gomphus furcifer, Hagen. High Park and East Toronto, June 15, (Walker).

Dromogomphus spinosus, Selys. Lake Simcoe, July to Sept., (Walker).

Macromia illinoiensis, Walsh. Lake Simcoe, July to August, Algonquin Park, Aug., (Walker).

Dorocordulia libera, Selys. Lake Simcoe, July 8, (Walker).

Ladona julia, Uhler. Algonquin Park, July 5, (Macoun).

Tramea carolina, L. One male of this fine large southern dragon fly was taken by Dr. E. M. Walker, in High Park, Toronto, May 24, 1904.

Diptera.

(Arranged according to a Catalogue of North American Diptera by J. M. Aldrich (Smithsonian Mis. Col. XLVI. No. 1,444.) The numbers refer to the pages of the Catalogue.)

166. *Bibio nigripilus*, Loew. Common in April, Vancouver, (Harvey); Victoria, (Anderson).

179. *Sargus decorus*, Say. Victoria, (Anderson).

202. *Tabanus captonis*, Marten. Mt. Arrowsmith, B.C., July 28, (Fletcher).

203. *Tabanus epistatus*, O. S. Sumner, N.W.T., June 23, 1903, (Willing); Deloraine, Man., Ottawa, June 23, 1903, (Fletcher).

204. *Tabanus illotus*, O. S. Moosomin, N.W.T., June 23; Tantallon, N.W.T., July 23; Prince Albert, N.W.T., July 23, (Willing); Indian Head, N.W.T., July 1, (Fletcher).

204. *Tabanus lasiophthalmus*, MacG. Ottawa, 29 May, (Fletcher).

204. *Tabanus lineola*, Fab. Ottawa, Aug. 8, (Fletcher).

Tabanus Osburni, Hine. Deloraine, Man., 1902, (Fletcher).

207. *Tabanus Reinwardtii*, Wied. Millarville, Alta., July 27, 1903, (Dod).

207. *Tabanus septentrionalis*, Loew. McLeod, Pincher, Pine Creek, Spruce Grove, Tofield, all N.W.T., July 2-27, (Willing).

207. *Tabanus sonomensis*, O. S. June 20, Vancouver, (Harvey); Mt. Arrowsmith, B.C., July 28, (Fletcher).

209. *Tabanus vivax*, O. S. Little Current River, Hudson Bay slope, 22 July, 1903, (Wilson).

209. *Tabanus zonalis*, Kirby. Mamamattawa, Hudson Bay slope, 21 June, 1903, (Wilson).

230. *Anthrax eumenes*, O. S. Victoria, (Anderson).

259. *Cyrtopogon dasylloides*, Will. Victoria, (Anderson).

351. *Paragus bicolor*, Fab. Victoria, (Anderson).

352. *Chilosia lasiophthalmus*, Will. Victoria, (Anderson).

361. *Melanostoma stegnum*, Say. Common, end of April, Vancouver, (Harvey).

363. *Didea laxa*, O. S. One male, April 24, Vancouver, (Harvey).

363. *Lasiophthalmus pyrastri*, L. Victoria, (Anderson).

364. *Syrphus americanus*, Wied. Common, April-May, Vancouver, (Harvey).

365. *Syrphus diversipes*, Macq. Common, April-May, Vancouver, (Harvey).
366. *Syrphus macularis*, Zett. Victoria, (Anderson).
366. *Syrphus intrudens*, O. S. Common, April-May, Vancouver, (Harvey).
368. *Syrphus torvus*, O. S. Common, April-May, Vancouver, (Harvey).
382. *Sericomyia chalcopyga*, Loew. Victoria, (Anderson).
383. *Pyritis Kincaidii*, Coq. Victoria, (Anderson).
400. *Chrysochlamys crœsus*, O. S. Victoria, (Anderson).
402. *Criorhina Kincaidi*, Coq. Common, March to May, at willows and salmon-berry, *Rubus spectabilis*, Vancouver, (Harvey).
403. *Criorhina tricolor*, Coq. Two at end of May, Vancouver, (Harvey).
404. *Spilomyia fusca*, Loew. One pair, Trenton, Ont., Aug. 27, (Evans).
430. *Clausicella Johnsoni*, Coq. Ottawa, 26 June, (Metcalfe).
472. *Blepharipeza adusta*, Loew. April 30, Vancouver, (Harvey).
489. *Epalpus bicolor*, Will. One, Sept., Vancouver, (Harvey).
520. *Calliphora viridescens*, Desv. Victoria, (Anderson).
525. *Pyrellia cyanicolor*, Zett. Common, April, Vancouver, (Harvey).
563. *Lispa tentaculata*, De G. Victoria, (Anderson).

A good many flies have been collected during 1905, but very few of the eastern records sent in are of special interest. Those given above are almost all from the west, and most of them are additions to the Canadian list. All the identifications have been made by leading specialists.

INJURIOUS INSECTS OF THE FLOWER GARDEN.

BY ARTHUR GIBSON, DIVISION OF ENTOMOLOGY, CENTRAL EXPERIMENTAL FARM, OTTAWA.

Growers of flowering plants in gardens are often troubled with insect enemies of various kinds. Some of these attack the foliage, others the flowers, while others again bore into the stems and even into the roots. As the subject is an important one, an effort has been made to bring together such information as we had concerning certain little-known species, and to add, at the same time, short notes on some of the more regularly occurring pests in flower gardens, some of which may appear in destructive numbers during any season.

Injurious insects may be divided into two classes: (1) those kinds which bite their food, such as caterpillars, beetles, etc., and (2) those which suck up their food in a liquid form, by means of their beaks, such as the true bugs, plant lice, etc. When insects, therefore, are noticed doing harm to any plant, the first thing to do is to decide by the nature of the injury to what class they belong. If they are biting insects, some poison, such as Paris green, must be placed upon the food which will be eaten with it. If, however, they are sucking insects, some material which will kill by contact, such as kerosene emulsion, or whale oil soap, must be used. For the convenience of applying liquid applications to the foliage of plants a small spraying pump will be found useful. Good hand pumps suitable for use in ordinary flower gardens may be now purchased at a small cost, but it will pay in the end to get a good pump, even if this should be a few dollars more.

There are some insects, such as the borers, which cannot be reached by any outside application of spraying materials. Injury to plants by these insects, which work inside the stems and roots, is often of a serious nature and should be met with preventive remedies. In some cases the only thing to do is to cut out the infested part if this is possible, or destroy the whole plant so as to reduce the numbers of the insect.

It must be remembered, however, that all insects which occur in gardens are not injurious kinds. There are beneficial ones as well, which are continually doing good by destroying those species which do harm. These beneficial kinds should all be known to the gardener. Foremost amongst them are the different kinds of ladybird beetles (Fig. 35), which, both in their larval and adult stages feed almost exclusively upon plant-lice and scale insects.

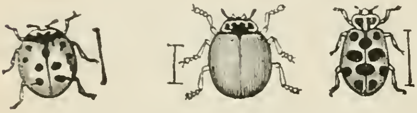

Fig. 35. Lady-bird beetles.

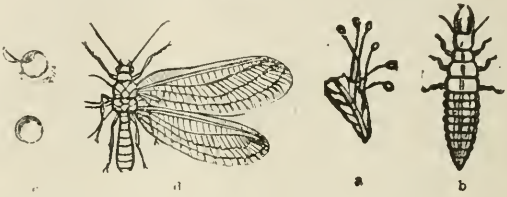

Fig. 36. Lace-wing fly; eggs much magnified; the fly, showing one pair of wings only; the eggs on their stalks; the larva.

Another kind of beetle, the Fiery Ground beetle, *Calosoma calidum*, Fab., is a particularly useful insect. This beetle, and its voracious black grub, which is called the Cutworm Lion, destroy enormous numbers of cutworms. The beetle shown in the figure is brownish black, with the wing cases spotted with coppery red in nearly all the eastern specimens. The appearance and habits of this good friend should be known to everyone. (Fig. 37.)

Other well-known beneficial insects belong to the parasitic Hymenoptera, four-winged flies, and to the Diptera, or two-winged flies. The females of these large groups of flies deposit their eggs upon or in the bodies of cutworms and other injurious caterpillars. These eggs soon hatch and the young larvæ at once begin to feed upon the living caterpillar, which of course soon dies. The different kinds of Lace-wing flies (Chrysopa species) (Fig. 36) are also good friends of the gardener, their larvæ working particularly among the plant lice.

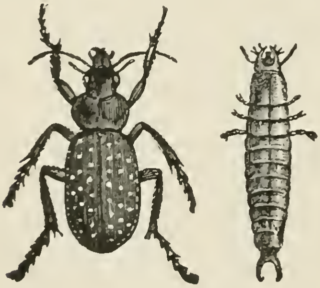

Fig. 37. The Fiery Ground-beetle and its larva, the Cutworm Lion.

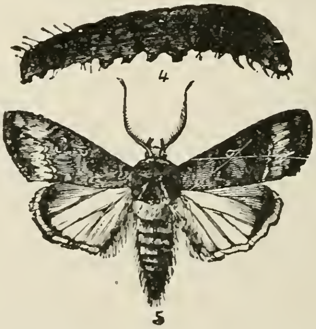

Fig. 38. Agrotis ypsilon; cut worm and moth.

INSECT PESTS OF IMPORTANCE.

Cutworms. These destructive insects are very troublesome in flower gardens, and when they are at all abundant no plants seem to be exempt from their attacks. The moths of some of the species lay their eggs in fall, others in spring, and some species pass the winter either as a pupa or a half-grown larva. Their ravages are most noticeable in the spring, just as young seedlings appear above the ground, or when annual plants have been set out. As they feed chiefly at night, their injury is quite apparent in the morning, when plants may be seen to have been cut or eaten off at the surface, or even a little below it. If the earth around such plants is examined, coiled up, dirty gray, or reddish brown, smooth caterpillars, about an inch or more in length, will be seen. Around some plants the writer has found as many as nineteen. They are all of some dull shade of color similar to the ground in which they hide during the day. When they occur in large numbers and their food supply is short, they feed by day as well as by night. In Ontario the two kinds which have given the most trouble in flower gardens are the Red-backed Cutworm, *Paragrotis ochrogaster*, Gn., and the Dark-sided Cutworm *Paragrotis messoria*, Harr. These two cutworms often occur together and it is sometimes difficult to distinguish between the two. Other cutworms which are present in some numbers almost every season, and which occasionally do serious damage, are the White Cutworm, *Paragrotis scandens*, Riley, the Spotted Cutworm, *Noctua c-nigrum*, L., and the Greasy Cutworm, *Agrotis ypsilon*, Rott. (Fig. 38). The Variable Cutworm, *Mamestra atlantica,* Grt., the moths of which are very abundant some seasons, may at any time do harm. (Fig. 39 shows another common moth of this family.)

During the past season, another kind of cutworm, that of *Barathra occidentata,* Grt., made its first appearance in Canada as a pest of importance. The moths of this species were very abundant at Ottawa in June, and later the larvæ appeared in considerable numbers and did serious damage to larkspurs, bleeding hearts, pansies, violets, etc.

As the habits of cutworms are very similar, the same remedy is applicable to all the species. As soon as their presence in a garden is detected, the well-known poisoned bran remedy, which has lately come into such wide use, should be applied. This is made by simply moistening some bran with a little sweetened water and gently dusting in Paris green, so that all the particles of the bran will be poisoned. The whole should be mixed thoroughly together and then placed in small quantities near, but not touching, the plants to be protected. Half a pound of Paris green is sufficient to poison fifty pounds of bran.

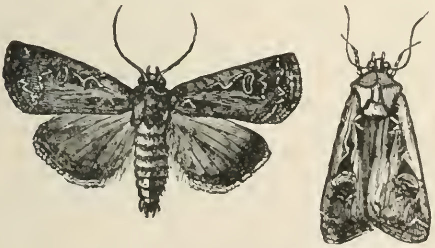

Fig. 39. Agrotis Subgothica.

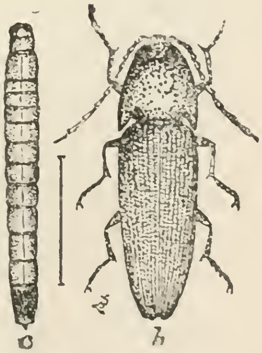

Fig. 40. Wire worm and beetle.

White Grubs. (*Lachnosterna.*) The roots of many kinds of flowering plants are often eaten by the larvæ of May Beetles, or June Bugs. These larvæ, which are known as White Grubs, usually occur in land which has been in sod for several years. (See Fig. 6.) During the past season at Ottawa the roots of asters and other annuals were eaten, causing the death of many plants. As these White Grubs take so long to come to maturity, there is no time during the growing season that they do not attack plants. Unfortunately the only remedy which has given any degree of success in garden practice, is the ploughing or digging up of the land in late autumn, by which time the larvæ will have made their winter cells; but where many perennials are grown this would be difficult. This disturbing of the soil in autumn breaks up their cells and exposes the larvæ and pupæ to the cold of winter. In spring, when the ground is dug again, all White Grubs seen should be picked up and destroyed. At this time if it is at all possible, should the infestation be severe, poultry or pigs may be turned into the garden. These animals are very fond of White Grubs and it is claimed they will soon rid a piece of land of them. In cities and towns it would hardly be possible to use pigs for this purpose, but poultry might in many cases be used to advantage.

Wireworms. (Fig. 40.) Occurring sometimes with White Grubs, but more often by themselves, are slender yellowish, or reddish-brown, shining grubs, which feed on the roots of almost all kinds of plants, and have somewhat the same habits as the White Grubs. These are Wireworms, the larvæ of the Click-beetles. The digging up or disturbing of the soil twice in autumn, first in August, to destroy the tender pupæ, and in October or later, which will expose the newly formed beetles to the cold of winter, as mentioned under White Grubs, is also of use in reducing the numbers of this class of insects.

Tarnished Plant Bug. *Lygus pratensis*, L. This common plant bug is troublesome, more or less, in gardens almost every season. When it is very abundant it is a difficult insect to combat. It not only sucks the juices from the leaves, but also attacks the flowers of many annual and perennial plants, causing them to become distorted. The spraying of the infested plants with kerosene emulsion or whale oil soap may be resorted to, or they may be dusted with insect powder, but these remedies are not always satisfactory. These bugs are most active during the heat of the day, but in the early morning they are comparatively sluggish, at which time they may be beaten off the plants into an inverted umbrella and then put into some receptacle containing coal oil and water. As this insect passes the winter in the perfect state, all garden rubbish should be burned in the fall. This practice of cleaning up gardens is important, as it reduces the shelters which harbor this and many other kinds of injurious insects.

The Four-Lined Leaf-Bug. *Pœcilocapsus lineatus*, Fab. Another plant bug which is very destructive at times, and which is a bright greenish-yellow insect, three-tenths of an inch long, with two black spots on the thorax and four stripes of the same color down the back, is the Four-lined Leaf-bug. This insect, unlike the Tarnished Plant Bug, passes the winter in the egg state, the eggs being laid in the autumn in the terminal twigs of currant and other bushes. The eggs hatch the following spring and the young nymphs at once begin to feed on the foliage, which soon becomes spotted with brown. The eggs are white and once they are known, it does not take very long to look over a bush and clip off the shoots containing them. When the insects have been troublesome during the summer, the eggs should be looked for in the fall and destroyed. A strong kerosene emulsion (1 to 6) will reduce the numbers of the nymphs and perfect insects. Pyrethrum insect powder dusted on the plants is also useful, as well as the beating of the insects into open pans containing coal oil and water. The plants most attacked in gardens are sage, mint, gooseberry, currant, weigelias, dahlias and snap-dragon.

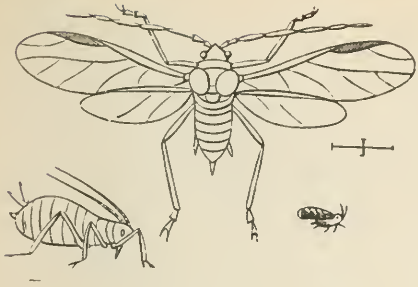

Fig. 41. Plant-lice.

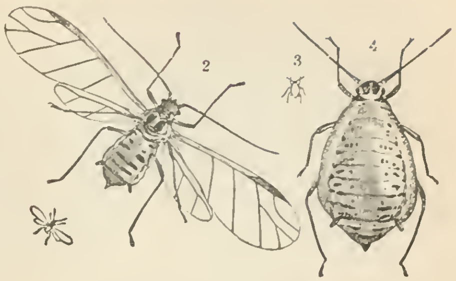

Fig. 42. Plant-lice.

Plant Lice. (Figs. 41 and 42.) This class of injurious insects, which are chiefly known from their attacks on shrubs and trees of various kinds, as well as upon plants in vegetable gardens, are every year the cause of much damage in flower gardens. Some seasons their injuries are very serious, the growth of many flowering plants being stunted or completely destroyed. There are a great many different kinds of plant lice, or aphids, in Canada, but most of these have in general the same feeding habits. They are all sucking insects and live solely on the juices which they extract from their host plant. Some kinds feed on the under side of the foliage, others cluster on the stems of plants, and others again are found attacking the roots. Those which feed on the foliage often cause the leaves to curl and become conspicuously distorted.

One species in particular about which much enquiry is made in Ontario, is the Snowball Plant-louse. Large clusters of these insects are found on the under surface of the leaves, which soon become drawn up, giving a very unsightly appearance to this beautiful and popular bush.

When plant lice are first noticed the plants should be sprayed with kerosene emulsion, or whale oil soap. The dark kinds are the more difficult to kill, and the solution used will have to be stronger. Whale oil soap, one pound in four gallons of water, will be necessary. During the past year some new methods of making kerosene emulsion have been devised by Mr. F. T. Shutt, Chemist at the Central Experimental Farm, Ottawa. One of these emulsions is worthy of notice here and is particularly applicable for immediate use in gardens and over small areas. This is made by mixing two ounces of flour in a little scalding water, afterwards adding one quart of kerosene, and then two gallons of water, stirring the whole thoroughly for a few minutes.

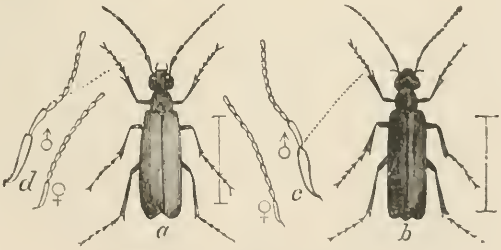

Fig. 43. Blister-beetles.

Blister Beetles, *Epicauta pennsylvanica*, De G., (Fig. 43), *Epicauta vittata*, Fab., (Fig. 44), and *Macrobasis unicolor*, Kirby. These active, soft-bodied, beetles, from their habit of suddenly appearing in large numbers, often do much damage in gardens before their presence is detected. They have a great variety of food plants, among which are the various kinds of China and German asters, dahlias, and some other Compositæ. As a rule Blister Beetles only do damage in years following excessive locust outbreaks. In their larval state, as is well known, they are predaceous parasites on the eggs of grasshoppers, and therefore when the beetles appear in numbers it is undesirable to destroy them if this can be avoided. Although the attack is generally severe while it lasts, the period during which Blister Beetles injure vegetation is not of long duration, and, besides this, they do not occur injuriously every year. Like other leaf-eating insects, however, these beetles can be destroyed by spraying the plants with a Paris green, or other arsenical, mixture. In small gardens a simpler remedy is to beat them into a pan, or other shallow vessel, containing water with a little coal oil on the top.

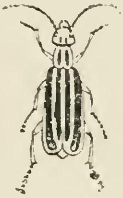

Fig. 44. Striped Blister-beetle.

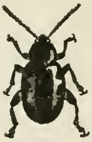

Fig. 45. Flea-beetle. (Much enlarged.)

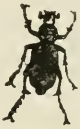

Fig. 46. Rose beetle.

Flea-Beetles. (Fig. 45.) The foliage of some kinds of garden plants is often partly, or wholly, devoured by small active beetles, which leap like fleas, owing to which habit they are known by the name of flea-beetles. There are a number of different species in Canada, two of which specially are responsible for much damage. In early spring at Ottawa, the white flowers of the favorite border and rockery plant, Alpine Rock Cress, *Arabis alpina*, L., are nearly every year injured, some seasons very seriously, by *Phyllotreta vittata*, Fab., which, on account of its great destructiveness to the leaves of turnips, is called the Turnip Flea-beetle. The perfect beetles are about one-eighth of an inch long and in color are black, shining, with yellowish marks on the wings. On several occasions the Red-headed Flea-beetle, *Systena frontalis*, Fab., has been the cause of much injury in the Botanic Garden of the Central Experimental Farm. (Report Entomologist and Botanist, Dom. Exp. Farms, 1889.) Young plants and low shrubs of a great many orders were attacked, their ravages being particularly to some species of *Althæa*, *Hibiscus* and *Weigelia*. Injury was all done by the perfect beetles, few plants appearing to come amiss to them. This flea-beetle is about one-fourth of an inch long and has a black head with a red patch on the top of the head in front. In August last the beetles were very abundant at Ottawa, particularly on the second crop of clover. Another flea-beetle which has not yet been identified is occasionally destructive at Ottawa to Forget-me-nots. Paris green and land plaster, or flour, in the proportion of one pound of the former to twenty of the dry diluent, dusted on infested plants, if possible when they are covered with dew, is one of the best remedies against these troublesome insects. The ordinary poisoned Bordeaux mixture is particularly effective against flea-beetles when applied as a spray, and indeed has been found to be by far the best remedy for controlling the Potato Flea-beetle, *Epitrix cucumeris*, Harr.

The Rose Beetle, *Macrodactylus subspinosus*, Fab. (Fig. 46.) This common enemy of the fruit-grower, known also as the "Rose-chafer" and 'Rose-bug," which every year does so much harm in vineyards and orchards.

is often very destructive to the flowers of rose bushes, as well as to the bloom of many other kinds of flowering plants. In Ontario this insect has been particularly abundant in the Niagara district. The mature beetles last for about five weeks and when present in large numbers are very difficult to get rid of. It has been found, however, by Prof. F. M. Webster that 95 per cent. of the adult beetles may be killed by spraying them with half a pound of fish-oil soap in a gallon of water. The suds must be thrown directly onto the beetles while they are clustered on the flowers. This remedy of course is only useful in killing the beetles on the plants; it has no effect in keeping them off afterwards. These beetles, although very active during the hot hours of the day, are sluggish early in the morning, and at this time may be easily beaten from the plants into an inverted umbrella and then emptied into some vessel containing water with coal oil on the surface. Rose bushes may be protected by covering them with netting.

The American Rose-Slug, *Endelomyia (Selandria) rosæ*, Harr. Occurring commonly in Ontario, and doing considerable damage every year to the foliage of roses, is a slug-like larva about one-third of an inch long, green in colour, swollen near the head, but not slimy as is the case with many other allied saw-fly larvæ. This false caterpillar is nocturnal in habit, and feeds on the upper side of a leaf, but during the day, when at rest, may be found concealed on the under-surface of the leaf. Infested plants will soon show the presence of these slug-like larvæ from the foliage becoming conspicuously skeletonized. These rose slugs may be easily destroyed by dusting the plants with white hellebore, or spraying them with a mixture of two ounces of hellebore to every two gallons of water. A weak solution of Paris green, one ounce in fifteen gallons of water, is also very effective.

The Bristly Rose-Worm, *Cladius pectinicornis*, Fourcr. Another saw-fly larva which is abundant in Ontario, and which, at Ottawa, is the commonest of the three rose saw-flies mentioned in this article, is the Bristly Rose-worm. This larva, when full grown, is about two-thirds of an inch long, and ranges in colour from dirty yellowish-green to a glaucous-green, with a darker green line down the back. This false caterpillar is covered with stiff hairs, which give it a conspicuous bristly appearance. The larva, when young, works very much in the same way as the Rose-slug, skeletonizing the leaves, and leaving whitish blotches. As it grows older, however, it eats out irregular holes all over the leaf, often consuming the whole substance, except the stronger ribs. The same remedies used for the Rose-slug are applicable for this insect.

The Curled Rose-Worm, *Emphytus cinctipes*, Nort. This rose-worm is also common all through Ontario wherever roses are grown, and, like the two preceding species, is an important enemy of that plant. The larva is easily distinguished from either of the other two kinds mentioned above, being smooth, and in having a yellowish brown head marked with a broad brownish-black spot. The body is dark green above, with the sides and legs grayish-white. This larva eats the entire substance of the leaf, feeding along the edges, with the body curled beneath it. When at rest it remains curled up on the under-surface of the leaf. Hellebore, or a weak solution of Paris green, is also recommended for the Curled Rose-worm.

The Small White Cabbage Butterfly, *Pontia rapae*, L. (Fig. 48). This pest of the market gardener, which now occurs right through Canada, not infrequently requires attention in flower gardens, from its ravages to stocks and other crucifers, mignonettes, nasturtiums and spider flower (*Cleome*). These velvety green caterpillars about an inch in length, with a broken yellow line along each side and an unbroken one down the middle of the back (Fig. 47), are particularly destructive to mignonettes, some seasons it being almost impossible to grow good plants. The insect is, however, an easy one to control. The dusting of infested plants with pyrethrum insect powder is about the best remedy for the caterpillars of this common butterfly. This preparation can be made by mixing thoroughly one part of weight of the insect powder with four parts of cheap flour, keeping the whole in a closed vessel for at least 24 hours. The mixture can then be distributed easily by placing it in a small bag of fine muslin which can be tied to the end of a short stick so that it swings freely. If the bag is tapped lightly with another stick held in the other hand, many plants can be gone over quickly and without tiring the operator. Many florists and seedsmen now sell proper bellows or dusters for applying dry powders, and these are not very expensive.

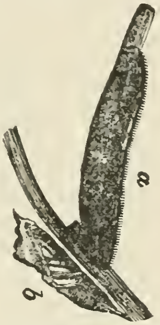

Fig. 47. Pontia rapæ: *a*, caterpillar; *b*, chrysalis.

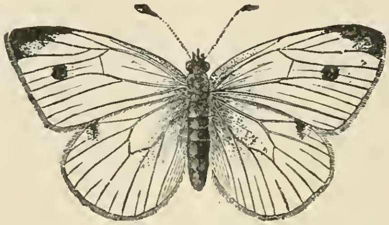

Fig. 48. White Cabbage butterfly.

The Diamond-Back Moth, (*Plutella maculipennis*, Curtis, *Plutella cruciferarum*, Zell. (See Fig. 33.) This well-known enemy of the market gardener, during some seasons does serious harm to wall-flowers, stocks, and other crucifers. The caterpillar which is from one quarter to three-eighths of an inch in length is green and very active. It is particularly abundant during July and August, but fortunately occurs irregularly, being doubtless held in check by parasites. These small caterpillars when disturbed run backwards, wriggling their bodies from side to side, and when they reach the edge of a leaf, they let themselves down by means of a silken thread. In garden practice infested plants may be sprayed with kerosene emulsion, or a soap mixture, to which Paris green or some other active poison has been added, the spray to be forced well up under the leaves if possible.

The Zebra Caterpillar, *Mamestra picta*, Harr. (See Fig. 2.) This common enemy of turnips, cabbages, clover, etc. is sometimes troublesome in flower gardens. In his 1896 annual report, Dr. Fletcher spoke of a serious infestation at Ottawa, the plants attacked in gardens being sweet peas, lilies, gladioli; in fact it was stated that the larvæ attacked indiscriminately almost all the annuals. On Oct. 3rd of the present year, the writer noticed the species feeding on asters. The caterpillar is a handsome one, about two inches long when full grown, velvety black on the back and having two golden yellow stripes on each side of the body, which are connected by narrow lines of the same colour, the head and feet bright reddish brown. When young the larvæ for a time feed together, but as they grow larger they separate and feed singly. There are two broods of the insect in the year, the second one of which occurs in September, and is the most troublesome. A remedy for these caterpillars is to spray infested plants with Paris green, one ounce in

10 gallons of water. Dusting the plants with pyrethrum insect powder is also useful. If only a few specimens are found in a garden, they can of course be removed by hand and destroyed.

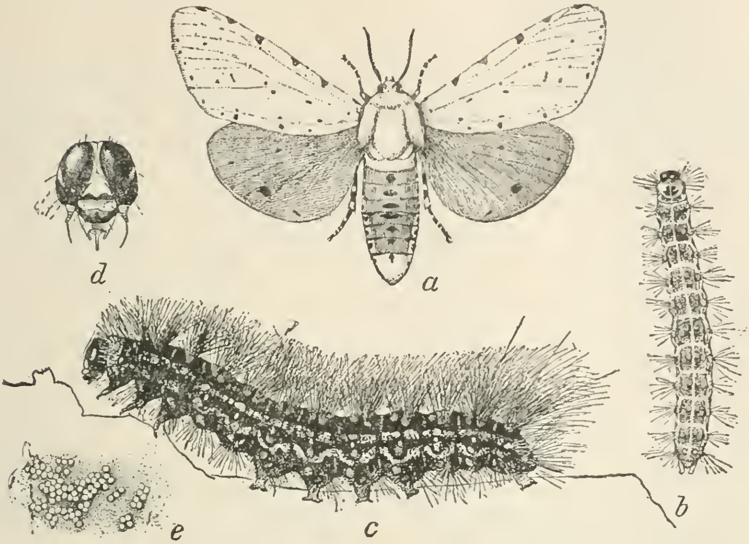

Fig. 49. Salt-marsh caterpillar and moth. (Chittenden, Bull. 43, Div. of Ent., U.S. Dep. Agr.)

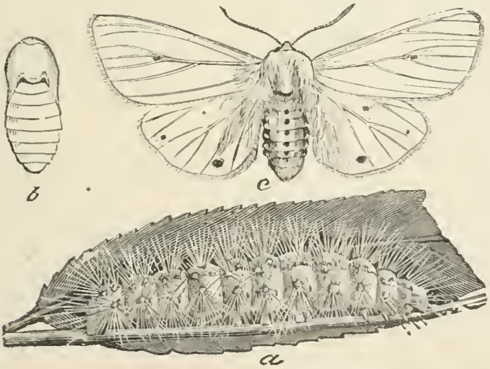

Fig. 50. The Yellow Woolly-Bear: *a*, caterpillar; *b*, chrysalis; *c*, moth.

Woolly-Bears. The caterpillars, or "woolly-bears," of two kinds of arctian moths, commonly occur in gardens, occasionally in sufficient numbers to demand attention. These are the Salt-Marsh Caterpillar, *Estigmene acræa*, Dru., (Fig. 49) and the Yellow Woolly-Bear, *Diacrisia virginica*, Fab. (Fig. 50.) Both of these caterpillars are, in general, of similar appearance and habits, and feed on a great variety of plants. The former kind is the larger, measuring when full grown about 2½ inches in length, and it differs from the Yellow Woolly-Bear in having a darker body and yellow markings along the sides. These caterpillars, as the name "woolly-bear" indicates, are quite hairy, the hairs of the former being mostly always reddish, or reddish brown, while those of the latter vary considerably, the hairs in some specimens being whitish, or pale yellow, while those in others are reddish, or reddish brown. Injury by these caterpillars is most noticed when they are in their younger stages during which time they feed together, but as they grow older and reach maturity they separate and wander off by themselves. Hand picking answers as a remedy in most cases, but if the attack should be serious, spraying with Paris green, or any other of the well known arsenical poisons, would soon destroy the larvæ.

THE OYSTER SHELL SCALE, *Lepidosaphes ulmi*, L. (Fig. 51). Occurring commonly in some districts in Ontario on rose bushes of many kinds are the oyster-shell shaped scales, which are so well known from injuries by the insects to fruit trees, particularly the apple. Unlike many other kinds of scale insects, the Oyster-shell Bark-louse has only one annual brood, the insect passing the winter in the egg state under the mother scales, and the young larvæ appearing in spring. If rose bushes are found to be heavily infested with this scale insect, they should be sprayed in late fall or early winter with a whitewash mixture, using one pound of unslaked lime to every gallon of water. A second spraying should be applied as soon as the first one is dry. The lime hardens on the bark and flakes off during the winter, taking with it the scales with the clusters of eggs. In June when the young lice hatch they may be easily seen running about on the bark preparatory to settling down. When detected the bushes should be sprayed with kerosene emulsion. A simple formula for making this for immediate use in gardens will be found under the paragraph treating of Plant Lice.

THE ROSE SCALE, *Diaspis rosæ*, Bouche. An unpleasant sight in rose gardens are clusters of roundish white scales which show up conspicuously in contrast to the greenish or reddish shoots of the rose bushes. This scale insect is sometimes very common on neglected bushes, and if not attended to will soon do serious damage. Being a sucking insect kerosene emulsion or whale oil soap are the best remedies. It has only so far occurred in the Province of Ontario around Lake Ontario, its worst attacks being on raspberries.

THE ROSE LEAF-HOPPER, *Typhlocyba rosæ*, L. This common leaf-hopper, which occurs all through the country, wherever roses are grown, is often seen in swarms on the leaves of these bushes. These insects are very small, pale greenish-white, and are often spoken of by the confusing name of "Rose Thrip." Throughout the summer they may be found on the leaves in various stages of development, and are frequently extremely destructive. They can be controlled, however, by spraying the bushes with kerosene emulsion or whale oil soap.

THE GRAPE VINE LEAF-HOPPER, *Typhlocyba comes*, Say, *T. vitis*, Harr, etc. An insect which demands much attention every year in Ontario is the Grape Vine Leaf-hopper. Although very destructive to the foliage of grapes, lovers of ornamental plants are often exercised over a small hopping insect which occurs in countless numbers on Virginian Creepers. These insects, also as in the case of the Rose Leaf-hopper, are erroneously spoken of as "Thrip." They are of a translucent white colour prettily marked with red and dark brown lines. In their younger stages they are pale and although lacking wings are almost as active as the full grown insects. These leaf-hoppers pass the winter in the perfect state hidden away amongst fallen leaves and other rubbish. The ground, therefore, should be raked and kept clean during autumn so as to reduce as much as possible the opportunities of these insects wintering near the vines. In all their stages these leaf-hoppers live by suction and therefore can be killed by contact insecticides. Kerosene emulsion and whale oil soap are the best mixtures to use, and the spraying should be done before the insects develop their wings. When these insects are present on a vine the leaves soon become white in patches and then fall to the ground.

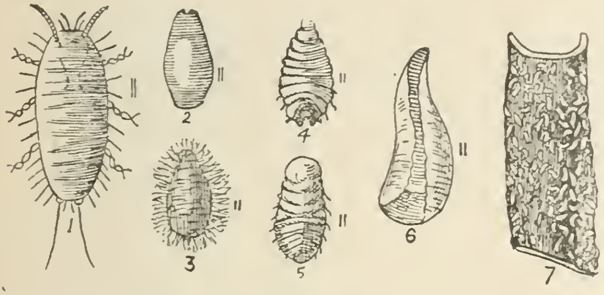

Fig. 51. The Oyster-shell Scale.

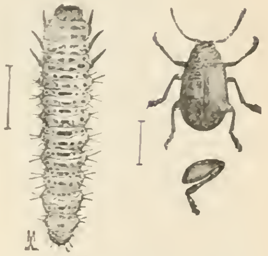

Fig. 52. Grape-vine flea-beetle and larva, much enlarged; also leg, greatly magnified.

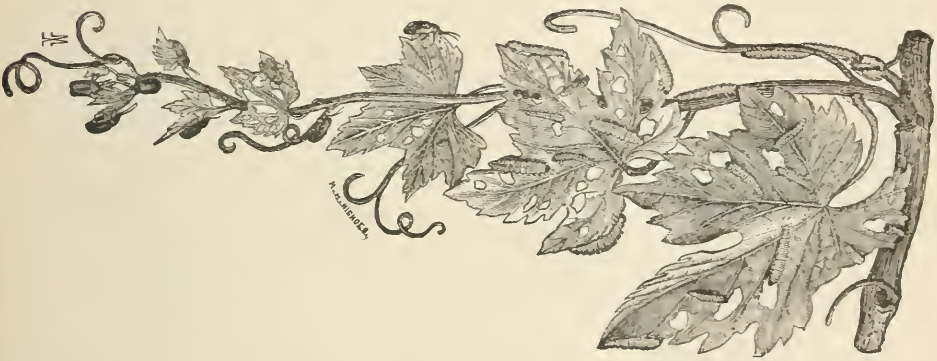

Fig. 53. Grape-vine Flea-beetle, showing beetles and larvæ at work.

The Grape Vine Flea-Beetle, *Haltica chalybea*, Ill. (Figs. 52 and 53). This is another well known grape insect, but one which often does much injury in Ontario to the foliage of Virginian creepers. When the dirty, yellowish-brown grubs, which have black shining bristle-bearing tubercles are found on the vines, they may be destroyed by a Paris green spray 1 oz. in 10 gallons of water. All fallen leaves and rubbish should be burned in autumn to prevent the mature beetles from hibernating near the vines.

The Violet Sawfly, *Emphytus canadensis*, Kirby. Pansies and violets, which are always favourites in gardens, are sometimes seriously attacked by the false caterpillars of this sawfly. These larvæ which are smooth and bluish-black in colour are about ½ an inch in length when mature. When in their younger stages they have the habit of eating little holes in the leaves, but as they reach maturity they feed mostly along the edge of a leaf. These false caterpillars when at all numerous do a great deal of harm, oftentimes completely defoliating plants. At Ottawa the species is of common occurrence, some seasons doing considerable damage. Last June and the first half of July the larvæ were very abundant on violets on the grounds of the Central Experimental Farm. In Canada, Dr. Fletcher tells me injuries by the Violet Sawfly, have not been reported from very many localities. In 1898 considerable injury was done in large beds of violets grown under glass in Toronto. As the larvæ feed as a rule during the night, Dr. Fletcher recommends as a remedy, the dusting of the plants in the evening with white hellebore, or with Paris green mixed with 50 times its weight of common flour, or some other dry diluent.

The Oblique-banded Leaf-roller, *Archips rosaceana,* Harr. (Fig. 54). This widely distributed leaf-roller, the caterpillar of one of the tortricine moths, is very common in Ontario and has a great range of food plants. At Ottawa the larvæ have been particularly abundant on apple, and in flower gardens we have found the species on roses, climbing honeysuckles, geraniums, spiraeas, and many other plants. The caterpillar besides rolling up the leaves very often has the habit of tying together the upper leaves and buds of flowering plants and then destroying the flowers. When full grown it is about three-quarters of an inch in length, green, with a darker green dorsal vessel; the head black in front, brownish at the top, as is also the top of the first body segment; the feet all black. This leaf-roller, although common and widespread, has never occurred in gardens in Ontario to require much attention. Handpicking as a rule will serve as a remedy, but if the caterpillars should appear in numbers spraying with some poison would soon destroy them.

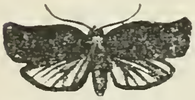

Fig. 54. Oblique-banded Leaf-roller moth.

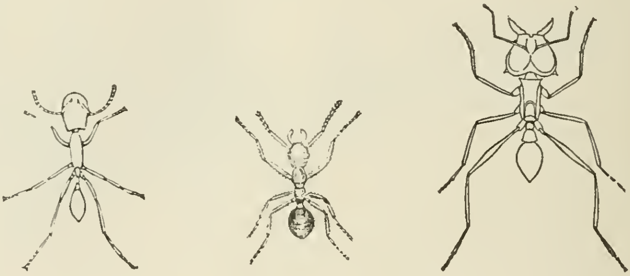

Fig. 55. Ants.

Ants (Fig. 55). Enquiries are frequently made for information concerning ants which infest garden plants of many kinds. It is generally believed that these insects do harm to plants, but this is not the case. In most instances, if close observation is made, it will be found that plant lice are present and are the real cause of the injury. The relations of ants to plant lice are very interesting. It is well known that ants are protectors of plant lice; they are very fond of the sweet honey dew which is emitted by them, and certain kinds even actually colonize them on plants near or inside their nests. Some ants indirectly, therefore, are very injurious, although they do not themselves feed upon plant tissue. When they are seen to be running about on plants, a search should be made for their nest which will, in all probability, be located in the earth close by. When this is found a tablespoonful of bisulphide of carbon should be poured into it and the opening immediately closed up by stepping on it. The fumes from this liquid will penetrate quickly into all parts of the nest, and not only kill the adults but the larvæ as well. This material is very inflammable and care must be taken not to bring a light near it. Another remedy is to pour scalding water into the nests.

Red Spider. Although chiefly a greenhouse pest, these minute mites are often found doing considerable damage to the foliage of plants in flower gardens, particularly during hot, dry seasons. The presence of these small creatures on the plants is easily detected by the leaves losing their colour, having a white, bleached appearance, and becoming stunted. These mites live by sucking out the juices from the leaves and in this way slowly reduce the vitality of the plants until in many instances they are completely killed. They do not seem to have a preference for any particular kind of plant, but possibly are more noticed, at least in this locality, on verbenas and roses. Some years when they are very bad it is almost impossible to grow verbenas. Probably the best remedy for these mites is to spray the plants with flowers of sulphur in the proportion of one ounce to every gallon of water. As these mites feed chiefly on the under side of leaves, the spray should be forced up among the foliage as much as possible. If only a few plants are found to be infested with red spider, the sulphur may be dusted on to the leaves by means of a small bellows, or other specially made implement, which is now used for such purposes, and sold by many seedsmen.

Snails and Slugs. These slimy, soft-bodied mollusks which, of course, are not insects, are included in this article, because the entomologist is often asked for information concerning them and particularly for a remedy for their destruction. Every year they are very injurious in flower gardens, and as they come out to feed in the evening an excellent remedy is to broadcast lightly over the soil, before nightfall, freshly slaked lime. This adheres to their bodies and soon kills them. Two or three applications on consecutive evenings will eradicate them thoroughly.

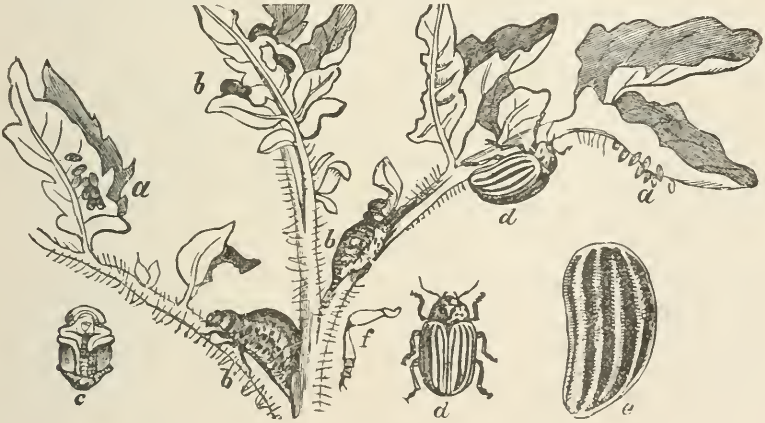

Fig. 56. Colorado Potato-beetle.

PESTS OF LESSER IMPORTANCE.

The Colorado Potato Beetle, *Leptinotarsa decemlineata*, Say. (Fig. 56). In the fall of the year, when there are few potato tops left in the fields, these beetles on account of the scarcity of food, wander about in search of something to eat, and often attack plants of the tobacco family as *Nicotiana affinis* and the newly introduced *N. Sanderæ*, both of which are favorites in flower beds because of their large foliage and showy flowers. The former is deliciously scented at night. These beetles swarm on to such plants in September and unless attended to at once quickly destroy the foliage and flowers. As soon as they are noticed the plants should be dusted with Paris green mixed with 50 times its weight of common flour, or some other dry diluent. If more convenient the plants may be sprayed with Paris green, using one ounce in every ten gallons of water.

The Milkweed Doryphora, *Labioderma clivicollis*, Kirby. In Eastern Ontario this bettle is very abundant on the common milkweed, *Asclepias cornuti*. Owing to its beauty, the Pleurisy-root, *Asclepias tuberosa*, is grown in some of the beds on the Central Experimental Farm, but every year the plants are attacked by this insect. Some seasons the species is very abundant and does a lot of injury. It is most prevalent during the month of August, and the injury is mostly done by the mature beetles. The insect although it is so abundant at Ottawa is, I believe, uncommon in western Ontario.

Homohadena badistriga, Grt. For some years the larvæ of this noctuid moth have been present, in more or less numbers, on several kinds of climbing honeysuckles, (*Lonicera* species) on the Central Experimental Farm. During certain seasons their injuries have been quite apparent. In May, 1901, the larvæ were abundant on many of the yellow-flowered varieties, which they seem to prefer. At this time caterpillars in all stages were found. Very young larvæ, about a quarter of an inch long, were collected, but no trace of eggs or empty shells could be seen. Every year since 1901 we have looked in vain for eggs, although we have found young larvæ which could not have been out of the egg more than a day or two. The young larvæ feed on the buds and foliage of the new shoots of the plant, hiding in the day time inside the two clasping leaves, which surround the cluster of flower buds at the tip. As they mature they crawl down to the shady side of the old wood of the plant upon which they rest when not feeding. When in the last stage the ground colour of the caterpillar is remarkably like that of the stem, or twig, upon which it rests.

The Iris Borer, *Macronoctua onusta*, Grt. In the 1903 report of this Society, the writer reported the occurrence, in destructive numbers, of the larvæ of this noctuid moth, which is rare in collections, and gave notes on them and on the pupæ. During the past season the species was again observed in some of the Iris beds on the Central Experimental Farm, but not in destructive numbers. Full grown larvæ were found on July 21. Nothing new was noted with regard to their habits.

The Columbine Borer, *Papaipema purpurifascia*, G. & R. Mention of an infestation by this insect at Ottawa in 1904, was made by the writer in our last annual report. During the past season this borer was again very destructive at Ottawa to cultivated Aquilegias. On June 29 they were very abundant, boring into the stems. At that date they were 7-8 of an inch in length and only a few had entered the roots. On July 13 as many as 13 larvæ were found in one columbine plant, and every plant in a large bed seemed to be seriously infested. It was interesting to note this year, however, that many of the larvæ were parasitized by a *Tachina*, possibly one-third of the larvæ collected.

The Burdock Borer, *Papaipema cataphracta*, Grt. This is another noctuid borer, but one which, while abundant almost every season at Ottawa, seems to be of rather uncommon occurrence in other parts of Ontario. Unlike the two mentioned above, this larva seems not to mind adapting itself to any plant with a succulent stem, and so has been found infesting a variety of different plants. At Ottawa, the favourite food plant is burdock, and two or three larvæ are often found in the same plant. During the past season the caterpillars were quite abundant at Ottawa, and in about an hour's time, on July 27, Dr. Fletcher and I collected nearly fifty specimens. These with the exception of two were all found in burdock. Other plants in which we have found this borer are Canada Thistle, dahlias, lilies, sunflowers, tomatoes, potatoes and rhubarb.

Unfortunately, owing to the boring habits of these larvæ, there is no remedy for them other than cutting off the portion of the plant containing the caterpillar and destroying the latter. It is seldom, however, that these insects are sufficiently abundant to be destructive enough to cultivated plants to cause alarm. As a rule it is only a very small number of plants which are attacked. The presence of these borers in gardens can usually be detected by the unhealthy appearance of the plants, the tops in most instances having become withered and fallen down to one side.

THE SPIRÆA LEAF-TYER, *Olethreutes hemidesma*, Zell. In 1901 the leaves of several of the Spiræas in the Arboretum of the Central Experimental Farm, were drawn together at the tips of the plants by beautiful little larvæ about half an inch in length. Specimens of these were collected on June 18 and moths reared, the first one emerging on July 3. These caterpillars were fairly abundant on a few bushes and their feeding places could easily be detected at the tips of the branches. The caterpillar is very dark velvety green, with conspicuous rows of white tubercles on the body, each of which bears a long slender hair. The head is tawny, with a distinct black band on the posterior margin of cheek; ocelli and antennae black. Thoracic shield concolorous with head centrally, but black on most of the lower third. Thoracic feet black. Specimens of the moths were kindly identified by Mr. W. D. Kearfott.

THE ASTER SHARK, *Cucullia convexipennis*, G. & R. At Ottawa the larvæ of this noctuid moth are some years fairly abundant feeding chiefly on the the flowers of China asters. They have never been abundant enough to do very serious injury, as a rule not more than one or two specimens being found on the same plant. Full grown specimens have been found during the latter part of August and in September. The caterpillar is a rather striking one when mature, measuring over an inch and a half in length, with a wide reddish band down the centre of the back, on either side of which are four or five dark brown irregular lines, the colour between being white. The sides are white with transverse bands of brown. Just above the feet is a bright, wide band of red. On the under side are some more irregular lines. The head and front feet are shiny black, the hind feet being dark brown. When present on a plant the larvæ are generally seen lying among the florets, and as a rule are quite conspicuous, although sometimes they are rather difficult to detect on account of their colours resembling those of the flowers. Occasionally we have seen specimens resting on the stems of the plants.

THE MINT SPHINX, *Sphinx eremitus*, Hbn. On several occasions we have found, at Ottawa, the full grown caterpillar of this beautiful hawk-moth, feeding in flower gardens on Monarda and mint. The species is not at all common in Ontario, and collected specimens are always considered good finds. Two dates on which we have found the larvæ are 25th August and 20th September.

THE BORDERED SALLOW, *Pyrrhia umbra*, Hufn. The young larvæ, green spotted with black, of this noctuid have the habit of eating into the buds of *Delphinium*, *Aquilegia* and many other garden flowers. The larvæ are also frequently found late in the year on many low plants, particularly on different species of *Polygonum*. There are two distinct forms of this larva, one being green spotted with black tubercles and having conspicuous dark longitudinal stripes, the other milk-white with a cross-shaped orange blotch in the centre of each segment on dorsum. This latter form also has markings along the body but these are indistinct.

THE BRONZE COPPER, *Chrysophanus thoe*, Bdv. (Fig. 57.) In the Botanic Garden at the Experimental Farm, plants of the genus *Polygonum*, are almost every season, more or less, attacked by the caterpillars of the above butterfly. These infestations are never very serious, but on one or two occasions the larvæ were rather abundant and noticeable injury to the foliage was done. It is not likely, however, that these caterpillars will ever become sufficiently numerous to require attention. Some of the cultivated Polygonums are familiar in flower gardens and if this insect should be found doing serious injury, Paris green applied to the foliage either in a spray, or a dry diluent, would soon destroy any caterpillars present. Injury to the foliage of such conspicuous plants as these is easily recognized, and further damage can be prevented if prompt action is taken. The ordinary wild food plants are various species of Rumex.

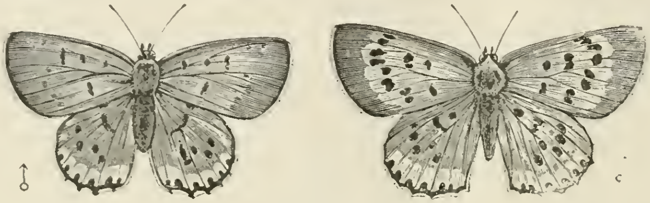

Fig. 57. Chrysophanus thoe ; male and female butterflies.

The Sunflower "Peacock Fly," *Straussia longipennis,* Weid. Stems of the common sunflower, *Helianthus annuus,* L., at Ottawa are invariably infested by the maggots of this fly. These insects, or "peacock flies" so-called, because of their habit of elevating the wings and strutting about peacock-like, are very beautiful, the wings of many of the species being prettily marked and spotted with black or brown. At Ottawa the above species has been so abundant some seasons that it has been impossible to find a sunflower plant of which the pith had not been almost entirely devoured. Plants, however, the pith of which had been tunnelled from the base to the very flowers grew remarkably well and kept green and vigorous up to the first frosts. This insect, therefore, does not appear to injure the sunflower to any practical extent. The flies may be found in early summer.

Injury to Pinks and Carnations by an Anthomyian. Occasionally in flower gardens in different parts of Canada, various kinds of pinks and carnations have been injured by Anthomyian larvæ. In Dr. Fletcher's report for 1885 it is stated that injury at Victoria, B. C. was first noticed about the middle of May. Referring to this attack Dr. Fletcher says: "The egg appears to be laid at or near the base of the topmost leaves. The young maggot burrows beneath the epidermis of the base of the leaves for some time and then bores down the centre of the stem." Specimens of this Anthomyian were bred at Victoria by Mr. J. J. Cowley. The maggots left the plants about 1st June and went into the ground to pupate. The flies appeared about 10 days later. During the same year Dr. Fletcher found a specimen at Ottawa which was destroying Indian Pinks in exactly the same manner as those in Mr. Cowley's garden. This specimen produced a fly which Dr. Fletcher says, was apparently identical with those bred at Victoria by Mr. Cowley. Since then the species has been found to be rather destructive to the shoots of the pretty perennial *Gypsophila paniculata,* which also belongs to the Pink family.

The Variegated Fritillary, *Euptoieta claudia,* Cramer, (Fig. 9.) In July last an enquiry was received at the Division, concerning a caterpillar which was destroying pansies at Baltimore, Ont. The correspondent, Mr. T. M. Wood, writing to Dr. Fletcher, July 18 said: "I send herewith two caterpillars which I found on a row of pansies. About a week ago there were dozens of them but to-day I got but five, which I put in a box with a pansy plant. I see to-night they are changing to the pupa state." The specimens arrived at Ottawa on July 20 and proved to be *Euptoieta claudia*, Cramer. The occurrence of the species in numbers, at Baltimore, Ont., is very interesting, as the insect is rare in Ontario, only a few previous records of the butterfly having been recorded by collectors. In the North-west the butterfly is much more abundant, and was found, by Dr. Fletcher, very destructive to pansy beds at Kinistino, N. W. T. Dr. Fletcher tells me he has seen the females ovipositing on the wild flax, *Linum sulcatum*.

Sparganothis (*Œnectra*) *flavibasana*, Fern. In June, 1895, this species was found in some numbers by Mr. J. A. Balkwill, at London, Ont., and specimens of the moth were identified, through our late Curator, Mr. J. Alston Moffat, by Prof. C. H. Fernald. Mr. Balkwill found his first specimens at rest upon honey-suckle in his garden, but later found some pupæ which produced the moths. In the *Canadian Entomologist*, October, 1895, Mr. Moffat says: "Presumably the larvæ had fed upon the honeysuckle, as chrysalids were found in the connate leaves with a thin silken web spun over them, one of which I raised to the moth. There is plenty of evidence of feeding having been done upon the plant, but nothing positive as to what did it. A lookout is being kept upon the plants for the next brood." Under date of November 17, 1905, Mr. Balkwill writes: "Your letter of the 15th inst. is to hand. I am sorry that I am unable to give you the information desired. I captured the moths on honeysuckle and found some of their cocoons, which were reared to mature insects. We could not find the larvæ although Mr. Rennie and I kept a good look out for the next two years."

THE GREENHOUSE LEAF-TYER, *Phlyctænia rubigalis*, Gn. = *Phlyctænia ferrugalis*, Hbn. In Canada this insect has never been reported as doing any injury to plants other than those grown under glass. In the United States, however, the caterpillars are known to feed on several kinds of crop plants, as celery, cabbage, beets and tobacco, as well as on a great many ornamental plants grown outside, such as wall-flowers, dahlias, daisies, begonias, roses, nasturtiums, geraniums, carnations, etc. The insect is abundant in some of the large greenhouses in central and western Ontario and mention has been made of injuries by the larvæ in Toronto, in the annual reports of the Dominion Entomologist for 1899 and 1900. Since that date Dr. Fletcher and the writer have published the life-history of the species in the May, 1901, number of the *Canadian Entomologist*. When full grown the caterpillar is about three-quarters of an inch in length, of a semi-translucent green colour, with two distinct black spots (one on each side) close behind the head, and a green dorsal vessel showing distinctly down the middle of the back, bordered on each side with a double white band. As its popular name would suggest the caterpillar has the habit of drawing together portions of a leaf, or of two leaves that happen to be contiguous, and tying them with fine threads of silk. This webbing of the leaves is more apparent, of course, as the larva reaches maturity and owing to its manner of protecting itself it is rather difficult to reach with a spraying mixture. A Paris green or some other arsenical mixture would doubtless prove to be a remedy, should the caterpillars be noticed working on any plants in flower gardens, or many of them could be removed by handpicking.

ROSE ROOT-GALL, *Rhodites radicum*, O. S. (Fig. 58.) This large gall which is from 1½ to 2 inches in diameter is not infrequently found in Ontario on and at the roots of many kinds of wild roses, as well as sometimes on cultivated ones. The insect which causes this conspicuous gall is a four-winged fly, with a short round reddish body, belonging to the hymenoptera. At Ottawa we have found these galls irregular, smooth and potato-like rather oftener than elongated as shown in the figure. The only suggestion in the way of a remedy is to cut out the infested portions of the plants.

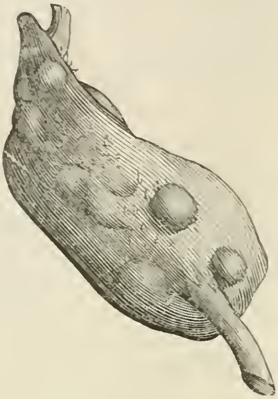

Fig. 58. Rose Root-gall.

Tortrix albicomana, Clem. The small caterpillars of this well known little Tortrix moth were very abundant and destructive to the leaves of Japanese Rose at Ottawa during the past summer. They were particularly abundant about the middle of June and moths were flying in large numbers around the bushes on July 8, on which date Dr. Fletcher collected many specimens.

Archips purpurana, Clem. Several specimens of the larva of this common, rather small, moth, were found at Ottawa by Dr. Fletcher during the past season in his cultivated beds of wild violets. No serious injury was done to the plants and the specimens when discovered were removed by hand.

THE HOARY PLUME, *Pterophorus monodactylus*, L. During the past season at Ottawa the small green caterpillars, much the same colour as the leaves of their food plant, of this plume moth were found to be very destructive to the Minor Convolvulus. These larvæ which were most abundant in September were found to be eating the flower buds and leaves at the tips, entirely preventing the plants from developing any flowers. Associated also with this species was the tineid *Bedellia somnulentella*, Zell, which helped to some extent in the injury.

LEAF MINER IN LEAVES OF LONICERA. During some seasons at Ottawa the leaves of one of the honeysuckles, *Lonicera fulgens*, have been mined by a small lepidopterous larva, which in 1901 we reared to the perfect state, and which has been identified by Mr. August Busck of the U. S. Bureau of Entomology, as *Lithocolletes fragilella*, F. & B. The larva makes a conspicuous blotch-like mine in the leaves, and on some foliage examined there were two or three mines in the same leaf. In 1901 the larvæ were first noticed about July 20 and by August 5 had pupated.

FOREST ENTOMOLOGY.

By E. J. Zavitz, Ontario Agricultural College, Guelph.

Destruction of the forest by insects is a problem in which the forester is very much interested. The depredations of these small foes are being carried on to a greater extent than we realize, and every season sees large quantities of timber being injured or destroyed by insects.

Entomology is of vast importance to the forester, and he should at least become acquainted with the appearance and life history of the important forest insects. In universities and forest academies in Germany where forestry is taught, special courses are given in Forest Entomology. The German forester carries in his pocket a small calendar in which he takes notes and in which is recorded what to look for during each month of the year. It is interesting to note that one of the subjects, taking greatest space, is that regarding the insects for which to be on the lookout during each month.

Insects damage forests in many ways and at various stages. The fruit, the tender seedling, and the roots, foliage and wood of the mature tree all have their enemies. In fact, during its whole life history the tree is subject to attacks.

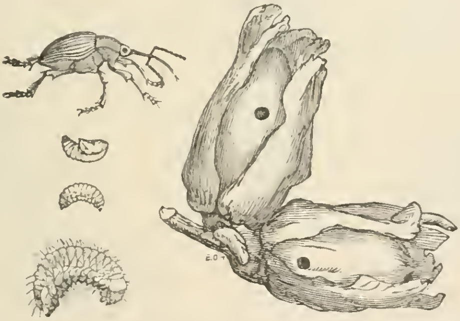

Fig. 59. Balaninus beetle, grub, pupa and infested nuts.

In collecting the acorns of Red Oak for seed I have found that a large percentage of the acorns are destroyed by one of the Curculionidæ. Two bags of acorns, which had been allowed to stand over night, were surrounded by footless grubs one centimetre in length. These are probably the larvæ of *Balaninus quercus*. It was estimated that about forty per cent. of these acorns were destroyed by this insect. The female insect bores a hole into the acorn and then drops in the egg which develops into the grub-like larva. This larva feeds upon and in most cases destroys the acorn. After the acorn falls to the ground in autumn the larvæ go into the soil and transform. coming forth the following spring. (Fig. 59 represents a closely allied species which attacks Filberts).

This shows that this insect alone is a strong factor against the reproduction of red oak under natural conditions. Curculios also infest the seed of such trees as basswood, hickory and chestnut.

During the seedling stages of the tree the insects carry on their work. The cutworm has given some trouble in cutting the white pine seedlings in the nursery beds. A number of small white ash were found to be dying, and upon examination it was found that the roots were attacked by the wireworm or larvæ of the click-beetle. The larvæ were hardly discernible at first as they had gone into, and were working in, the centre of the root. Damage was also done to the roots of some seedlings by the Lachnosterna larvæ. (See Fig. 6.) I regret that I am unable to identify the above species. However, I expect they will give me sufficient opportunity to further study them. The foliage of forest trees suffers from the work of a great variety of insects. This injury is not only unsightly but from the forester's standpoint hinders the proper development of the stem of the tree. Defoliation cuts off the food supply and so lessens the amount of wood laid on during the season. Considerable damage is annually being done by Lepidopterous larvæ. Owing to the fact that their life history is more easily followed than that of other orders there is considerable known and written concerning their work.

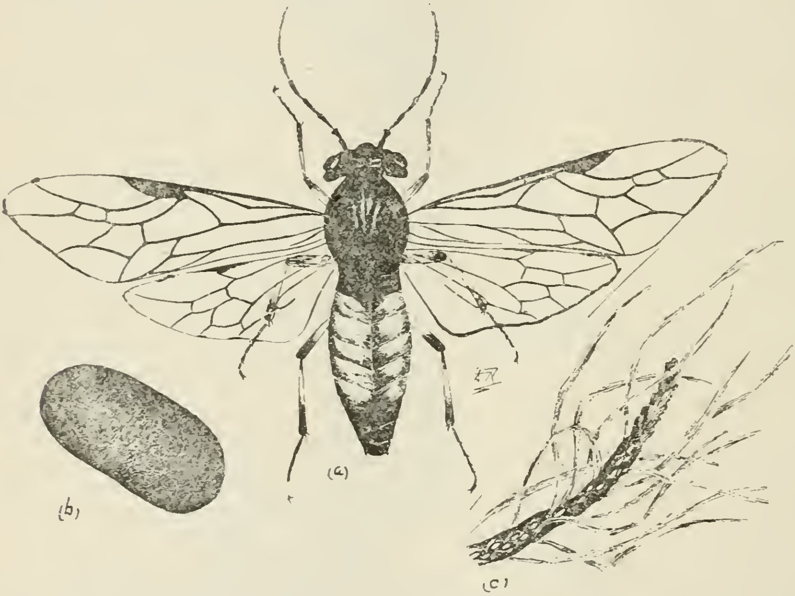

Fig. 60. Larch Saw fly ; *a*, with outspread wings ; *b*, the brown pupa case—both greatly enlarged ; *c*, terminal twig of Larch showing eggs in slits made by the female saw fly.

The Larch Saw-fly, (Fig. 60), a hymenopterous leaf destroyer, has done an enormous amount of damage in Canada. The tamarac has suffered from this insect throughout its known area of distribution and as yet its natural enemies have not controlled it. In the vicinity of Guelph this insect has done considerable damage to the European larch and our native tamarac during the last season.

Coleoptera, in both the larval and adult form, are responsible for damage done to the foliage. The Lamellicorns and Chrysomelids both feed upon the leaf in the adult form. Lachnosterna frequently does damage to the maple and other leaves, but not to any serious extent. The basswood or linden leaf seems to suffer most from their attacks and late in the summer it is almost impossible to find a perfect leaf. Large numbers of *Macrodactylus subspinosus* (Fig. 30) and *Odontota rubra* have been taken from this tree in beating operations and probably they are responsible for a great share of the damage done. Of the Coleoptera the Chrysomelids in the larval and adult stages do most damage to the leaves of forest trees.

Roots are attacked by the larvæ of Prionids and Lamellicorns. Buds have enemies in the Curculionidæ and Lepidoptera. Deformities on terminal branches are formed by Aphidæ, Cynipidæ and Cerambycidæ.

The direct injury done to the stem or timber part of the tree affects the forester most seriously. One of the Cossidæ or Carpenter moths, *Prionoxystus robiniæ*, was taken emerging from the sugar maple in the vicinity of Ridgeway, Ontario. The work of this Cossus moth was noticed in several trees in the same vicinity. These same maples are infested with one of the Siricidæ which I take to be *Tremex columba*. (Fig. 28.)

In the College nursery some Austrian pines about three feet high showed signs of dying in August. Upon examination it was found that the stems in some places were completely girdled beneath the bark. This work was being done by one of the Curculionidæ, *Pissodes strobi*, (Fig. 61), described in Bulletin 22, Division of Forestry. In July the leaves of these pines began to droop and by August they had turned quite brown. In the second week of October I took a number of mature insects from their little cells beneath the bark. Upon a further examination about the first of November I found they had left this retreat for hibernation in other quarters.

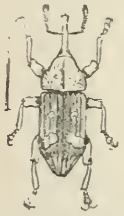

Fig. 61. Pissodes strobi, Pine-Curculio.

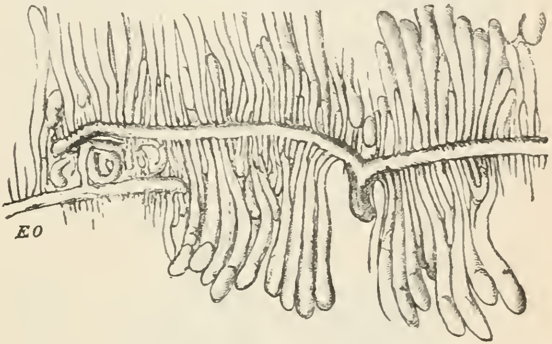

Fig. 62. Tunnels of Scolytus beetle.

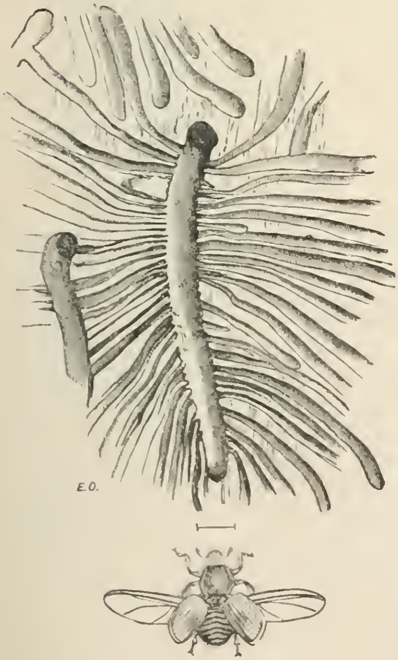

Fig. 63. Scolytus beetle and its tunnels.

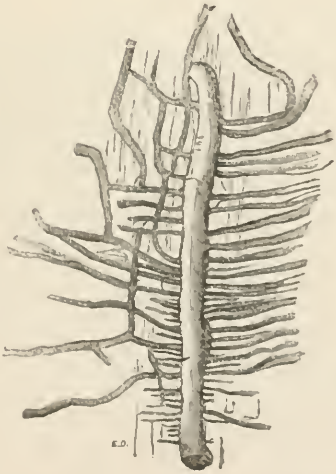

Fig. 64. Tunnels of Scolytus beetle.

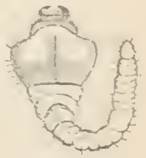

Fig. 65. Buprestis borer.

However, the insects which do the most serious technical injury to trees are the Scolytidæ, Buprestidæ and Cerambycidæ. These insects by boring either in the cambium layer, sapwood or heartwood of the tree leave channels which greatly lessen the commercial value of the tree. They attack the living tree in the forest, the log at the drive or mill, and the lumber in the yard.

The Scolytidæ work in the bark, cambium layer and sapwood (Figs. 62, 63 and 64) and this family is one most to be dreaded by the forester. Large areas of forests have been destroyed by members of this family. It would be impossible to estimate the value of timber destroyed by the pine bark beetle, *Dendroctonus frontalis*. Its distribution seems to cover the whole coniferous region east of the Rocky Mountains. An unidentified species of Scolytidæ has been doing some damage this season in the nursery to Scotch pine. The beetle is about two mm. long and has completely undermined the bark.

Buprestidæ (Fig. 65) and Cerambycidæ (Figs. 66 and 67) injure the stems of the tree in much the same manner. In some cases they make channels throughout the stem although some species work only beneath bark and in the sapwood.

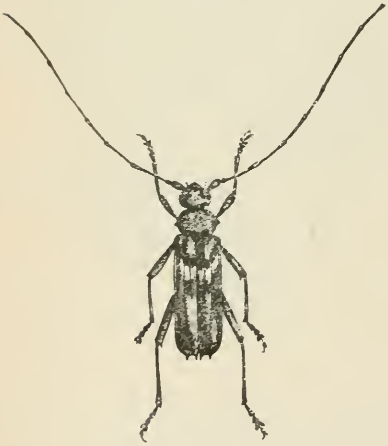
Fig. 66. Cerambycid beetle (wood-borer).

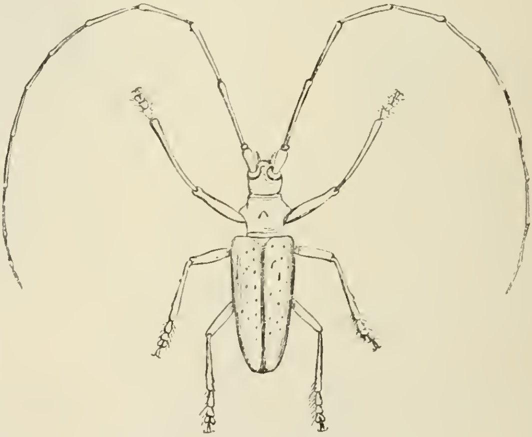
Fig. 67. Cerambycid Pine-borer.

The stems of second growth hickory (*Hicoria ovata*) in the vicinity of Ridgeway have been badly infested with the larvæ of *Goes pulchra*. The same trees are also attacked by *Dorcaschema nigrum* which girdles the terminal branches. Even after the tree leaves the forester's care it is liable to insect attacks. Upon examination of some hickory lumber, which had been piled so that the boards were in close contact, I found *Phymatodes variabilis* doing great damage. Thus throughout the whole history of the tree it is subject to insect injury and the amateur entomologist feels that the species to be studied are almost infinite in number.

From the systematic collector's efforts probably a large percentage of our forest insects in the adult form are now in collections throughout the country. However, this is a subject of economic importance, the forest being one of our greatest resources. Very little is known concerning the life history of our forest insects and only by research can the required knowledge be obtained. There is a wide field for the study of forest insects in relation to plant host, parasites or other enemies. Future protection can only be had in so far as we have men specially trained who recognize and understand the movements of these tiny foes.

PHLOX MITE—TETRANYCHUS BIMACULATUS.

By T. D. Jarvis, Ontario Agricultural College, Guelph.

This species of mite, for several years past, has caused injury to the cultivated perennial Phlox on the College Campus. It answers to the description of the "Red Spider". The leaves become spotted above and the under surface is coated with a fine loose web containing many minute particles. The small red oval mites may be seen with the naked eye and they vary from a few to as many as fifty or more on the under surface of a single leaf. (Fig. 68.)

Length of mite .433 m.m.; width .241 m.m.

Length of front legs, .241 m.m.; length of mandibles, .016.

Length of cephalo-thorax, .040 m.m.; length of hairs on legs, .100 m.m.

The legs of the mites are slightly orange or yellowish in color and six jointed.

The mites hibernate on the lower leaves of the plant. Up to the 20th of May the mite may be found feeding on the basal leaves of the plant.

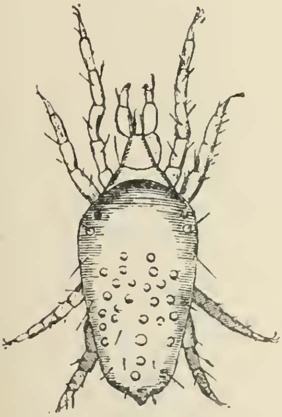

Fig. 68. "Red Spider," greatly magnified.

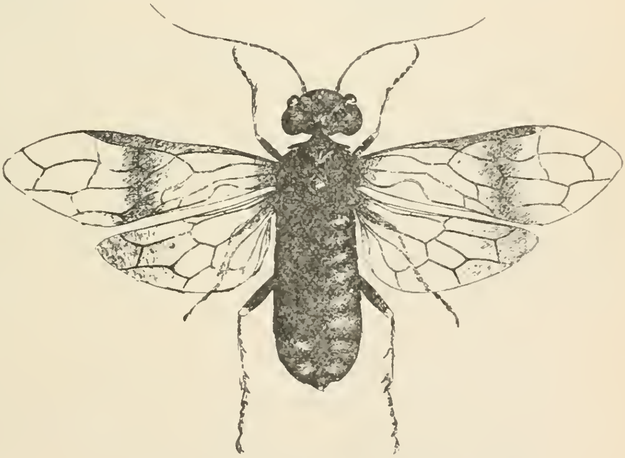

Fig. 69. Spruce Saw fly—greatly magnified.

BLUE-SPRUCE SAW FLY—LYDA SP.

By T. D. Jarvis, Ontario Agricultural College, Guelph.

This Sawfly has caused injury to the Colorado Blue Spruce, *Picea pungens*, on the College Campus at Guelph. It has not been found on any other species of spruce on the Campus.

The excrement of the larvæ lies in masses on the leaves and branches, and in some cases the tree becomes very unsightly. The larvæ are found in small colonies of from three to ten feeding beneath the masses of excrement. They cut off the leaves and carry them to their retreat under the excrement.

The larvæ (Fig. 70) are green and when full grown are 26 m.m. long and the antennæ 1½ m.m. long. The head and prothroax are black. The hair-like appendage on posterior segment of abdomen 1½ m.m. long. The abdomen contains 11 segments.

When mature the larvæ drop to the ground and make a little cell about 3 inches below the surface of the sod. They pass the winter as larvæ and pupate in the spring.

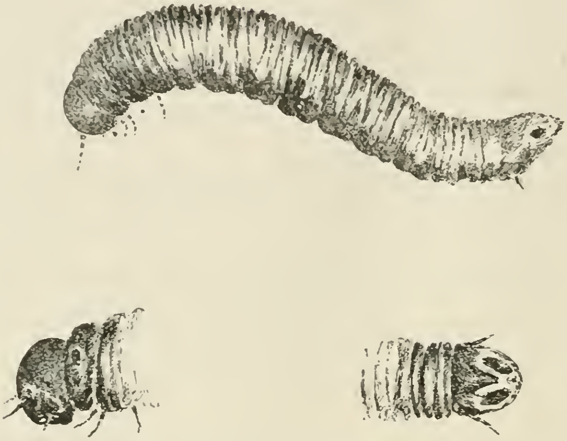

Fig. 70. Spruce Sawfly larva; head and anal segments—greatly enlarged.

The adult Sawflies (Fig. 69) appear about the 20th of May. They spend only a few hours depositing their eggs and then disappear. The sawfly is a large, black, shiny insect, about 14 m.m. long. The mandibles and a part of the face is yellow, the rest of the body is black. The thorax is feebly punctured. The antennæ are about 9 m.m. long and 32 jointed. The upper wings are mostly clear, while the lower wings are clear above and dusky toward the outer margin.

BUMBLE-BEES THAT FERTILIZE THE RED CLOVER.

By T. D. Jarvis, Ontario Agricultural College, Guelph.

In the month of June Mr. C. C. James, Deputy Minister of Agriculture, mailed to our department a letter which he had received from the New Zealand Government, enquiring for information on the species of Bombus that fertilizes the red clover in Ontario so that they might find out what species is most useful in clover fertilization.

The following is a copy of the letter received from Mr. O. B. Pemberton, Secretary of the Canterbury Agricultural and Pastoral Association, Christchurch, New Zealand, 26 May, 1905.

> *The Secretary of Agriculture.*
>
> Sir,—I take the liberty of writing to you on behalf of this Association regarding the fertilization of Red Clover in Canada.
>
> A Committee of this Association has been appointed to enquire into the fertilization of red clover in other countries with the view of the introduction of the bees most suitable as fertilizing agents.
>
> Before the introduction of the humblebee into New Zealand from England in 1855, the yield of red clover seed was not sufficient to be commercially payable. Since the introduction, however, the yields have been more prolific, but it is still thought that the best results have not yet been obtained.

We have in New Zealand, as far as we know, three kinds of humblebees, the descendants of those imported in 1885, viz., *Bombus terrestris*, *Bombus hortorum*, and *Bombus hortorum* variety *Harrisellus*. *Bombus terrestris* is the most numerous and is, I believe, considered quite unsuitable on account of the shortness of its proboscis.

My Association would deem it a great favor if you could forward me any information you may have gathered as to what bees or insects you have in Canada most suitable for the fertilization of the red clover.

Forty-eight specimens of bumblebees were collected from the flowers of the red clover. The specimens were sent to Dr. McGillivray, Cornell University, and identified. Three species were found—*Bombus fervidus*, *Bombus ternarius* and *Bombus borealis*.

Dr. Brodie, of Toronto Normal School, reports *Bombus consimilis* as being one of the more common species around Toronto.

Dr. Fletcher stated that *Bombus fervidus* is the most common species at Ottawa, while *B. borealis* is rare.

INJURIOUS INSECTS OF 1905 IN ONTARIO.

By W. Lochhead, Ontario Agricultural College, Guelph.

The number of injurious insects in the season of 1905 was about the normal, but the amount of damage done to crops of all kinds was perhaps below the normal,—there being no outstanding case of very serious loss.

The *Pea-weevil* no longer gives anxiety to the growers of peas, but in this apparent security from this pest lies the danger for the future. The farmer just now is able to give practically a death-blow to pea-weevils for many a year if he would insist on sowing only peas that have been fumigated with carbon bisulphide. It is an easy task to conquer and control an enemy when it is weak; and this is the present condition of the pea-weevil. If this precaution of using fumigated seed is not taken, the weevils will increase every year until they are beyond control.

A species of Joint-worm, (see Fig. 29), probably *Isosoma hordei*, was present in a few localities on wheat and barley, but did very little damage. It produces galls at, usually, the second joint of the stems, which are consequently deformed and weakened. Within the galls are the minute yellowish-white maggots with blackish jaws. The larvæ usually remain over winter within the galls, and the adults, small black four-winged flies, emerge in the spring. Fortunately there is only one brood each year.

It is doubtful if this Joint-worm will ever become a serious enemy in Ontario, where the majority of farmers practise a system of regular rotation of crops, and where the roadside and fence corner grasses are cut at the time of haying.

The Horn-Fly (Hæmatobia serrata), was more prevalent over the Province this past season than it has been for several seasons. Although this insect is now well known by nearly all farmers, yet it is remarkable how few stock-owners apply the simple treatments that have been advocated for years by the practical entomologists. This fly, it is well known, is one of the most annoying and troublesome pests of cattle in summer, and young cattle in good pasture are frequently annoyed to such an extent that they lose rather than gain flesh. Milch cows, too suffer much from these flies, and the supply of milk is always very much reduced in quantity during the "fly" season.

The life-history of the Horn-fly is well known. The eggs are deposited in fresh cow droppings, where the maggots develop and the pupæ form.

There are many broods during the season, so that their increase is very rapid. The adult flies are smaller than the house-flies. They congregate in masses about the base of the horns, on the flanks, and on the belly, just outside the reach of the tail or head of the afflicted animal.

For several years it has been observed that oils or greases rubbed on the affected parts will give relief for several days, and the flies will not come near. Fish oil is strongly recommended and has been used by many owners of stock. The addition of crude carbolic acid in the proportion of one tablespoonful to one quart of fish oil increases its effectiveness.

This past summer I had an opportunity of testing the effectiveness of kerosene emulsion solution against the Horn-fly. The emulsion is readily made and in the usual way, and was applied by means of a small hand spray pump. A fine nozzle was employed so that a very fine mist was obtained. I found that although the emulsion gave almost immediate relief and killed enormous quantities of flies that collected in the stable, yet it was necessary to repeat the operation during the worst portion of the season, both night and morning.

Unless I was present, the spraying operation was usually neglected, and the flies became as numerous as ever. It became apparent to me that if the stable employees about a large stock farm found it difficult to apply this kerosene emulsion sufficiently often to keep the flies away, we need not expect to have any better results in the ordinary farm stables where stock is probably not as well cared for.

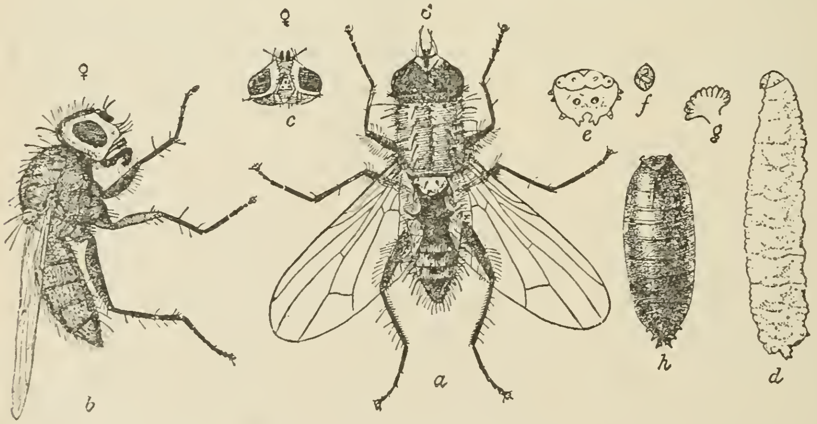

Fig. 71. The Seed-corn Maggot; *a*, *b*, flies; *d*, maggot; *h*, puparium—all very much enlarged. (After Chittenden, U.S. Dept. Agriculture).

In the dairy stables of the Ontario Agricultural College Zenoleum was used. It was applied with a compressed air sprayer. As it is readily made, the same objections cannot be found with regard to its preparation as against the preparation of the kerosene emulsion. The herd was kept free from the horn-fly with but two or three applications per week, and the herdsman is enthusiastic concerning the merits of this preparation.

Again, the use of the compressed air sprayer makes the operation a very simple one, and with the general introduction of such sprayers, we may hope to have less fear for the Horn-fly in the future.

Garden Insects.

The Seed-Corn Maggot (Phorbia fusciceps, Zett), Fig. 71. The work of this maggot on planted corn seed was brought to our attention about the third week in June, at St. Anne de Bellevue on the Island of Montreal. In a field recently planted many of the seeds sprouted very slowly, while others failed to sprout at all. On examination of the planted seeds many of them showed the presence of the Seed-corn Maggot. From the seeds that had not sprouted the maggots had hollowed out large cavities and had destroyed the embryos. In other seeds the cavities were smaller, and sometimes the embryo had escaped injury, with the result, however, that the germs were weak and made but little growth.

The seeds were planted at a time when the soil was cold and damp and for over a week the weather remained cold and wet, with the result that incipient decay set in, and the adult flies were attracted to the decomposed matter as a suitable place for oviposition.

It may be stated here that the stand of corn was a large one in spite of the number of injured seeds. After a dressing of soda nitrate had been given to the land, the crop developed well with returning warm weather, and a fine yield was obtained at the close of the year.

In 1900 I called attention to a destructive outbreak of similar maggots on beans in Lambton County. It is probable that the maggots in this case belong to the same species as those observed at St. Anne's.

The life-history of this insect is not well known. The adult is a two-winged fly about the size of a small housefly. Dr. Chittenden of Washington says it can best be identified by the male, which possesses a row of short, rigid, bristly hairs on the inner side of the posterior tibiæ.

The Seed-Corn Maggot is smaller than the Onion Maggot, being about ¼ of an inch in length. Dr. Chittenden says: "In the Northern States it is probable that we have at least two generations, the first injurious in May and June to such seedlings as are then to be found, and the second generation feeding upon weeds or dead or dying plants, in excrement and in refuse without their presence being manifested.

It has been surmised that the species agrees with others of its kind in passing the winter in the adult condition, although it is possible also that it hibernates in some localities at least as a puparium."

Professor Garman of the Kentucky Agricultural Experiment Station reports that this insect attacks young cabbage plants, in early spring, and hemp plants which are often destroyed over large areas. "The maggots work in the stems, but leave the plants, when ready to pupate, and enter the earth for a short distance, changing to yellow pupae .18 inch long and about .06 inch in diameter. Besides hemp and cabbage the insect is known as an enemy of planted seed corn, of radishes, onions, and of the common weed, hedge-mustard." Professor Garman calls this insect the *Fringed Anthomyian*, and places it in the Genus Pegomya.

The Tarnished Plant bug (*Lygus pratensis*). Many reports reached us throughout the season regarding the injuries done by this insect to cultivated plants of both the garden and orchard. In the garden it was specially injurious, for it pierced and deformed buds and terminal shoots of cabbage, cucumber, and potato, and sucked their juices. Flower gardens and plantations of small fruits suffered also, and reports came in of the blighting of strawberry blossoms and young berries, and of the blackening and shriveling of the currants. Besides, these insects attack many weeds and other wild plants. The insects are more numerous, and hence more readily noticeable by the public, in late summer, but most of their injuries are done in early summer.

The Tarnished Plant Bug (Fig. 72), is one of the true bugs, and obtains its food by piercing the tissues with its beak and sucking the juices. The adult insects are about 1-5 of an inch long, and are very variable in color, ranging from a dark brown through light brown to yellowish or yellowish-green. The broad region behind the head (prothorax) is bordered with yellow, and has four or five longitudinal yellowish lines; the triangular area behind the prothorax bears also a yellow V, and the upper wings are marked with dark and light spots.

The adults winter over under rubbish, and are ready in the early spring to attack the young buds and fruits. Their eggs are deposited on the food plants, and in a few days the young larvæ or nymphs appear. All through the season nymphs and adults may be found feeding together. The nymphs moult four or five times, gradually becoming more like the winged adults. There are probably only two broods in Ontario.

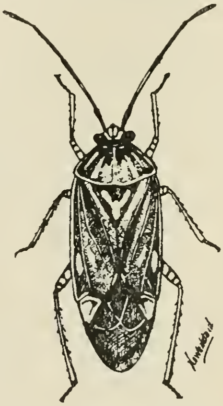

Fig. 72. The Tarnished Plant-bug—much enlarged.

On account of the fact that Tarnished Plant Bugs have a wide range of food plants, hence are widely distributed, and occur at all times of the season in every stage of development, treatment is difficult. The following remedies have been found somewhat effective and are here recommended:

1. The use of pyrethrum or insect powder. This should be mixed with four or five times its weight of flour and dusted on such plants as strawberries, garden flowers, cucumbers, potatoes, &c., in early morning while the insects are torpid and the dew is on the foliage.

2. The bugs may be readily shaken from infested trees and shrubs in early morning upon a sheet, and destroyed.

3. The application of a kerosene-emulsion spray or some good tobacco solution in early morning will destroy large numbers of the bugs, and help to keep them in check.

Root Maggots belonging to different species of insects attack the roots of cabbages, onions, and radishes, and do a great deal of injury. These along with the white grubs and wireworms are the *bêtes noires* of truck-gardeners. No satisfactory remedies have as yet been discovered for their control, and great losses are sustained every year through lack of information and treatment.

We are, however, specially indebted to Professors M. V. Slingerland and S. A. Forbes for their valuable investigations into the life-histories of these troublesome root insects, and for their experimental studies of remedial treatments. It is now fairly well known that many of the so-called remedies are utterly worthless.

The most common root maggots that are found affecting vegetables are the Cabbage or Radish Root maggot, and the Onion Maggot. The adults of these are small flies. These lay their eggs on the stems of the plants near the ground and the maggots on hatching make their way down the stem and begin burrowing into the roots. It is a common thing to find the surface of the roots of young radishes completely mined by maggots. When full grown these maggots form brown puparia in the soil. The cabbage or radish maggot does its chief harm in June and July, as the young radishes are coming up and after the young cabbages are transplanted.

With regard to remedies, it may be repeated that no perfectly effective remedy has been found for the cabbage root maggot, but the following remedies are valuable in controlling their depredations to some extent:

(1) Cheese cloth covers. In the large truck gardens of Long Island and New York, many of the growers resort successfully to the use of enclosures made of cheese cloth, arranged about light wooden frames. These may be made of any size, and can be removed at time of cultivation. If such frames are kept over the young plants for about six weeks, injury from these maggots may be completely prevented, since the fly is not able to deposit her eggs on the plants.

(2) Tarred paper disks. These were advocated by Prof. Slingerland, but the great objection to such a procedure is the trouble required to place the disks on the plants, and most growers of cabbages prefer to lose their plants rather than take this extra trouble.

(3) Hellebore or Insect Powder. Both of these insecticides have been used to great advantage. Dr. Forbes says "about one-half tea cupful of a decoction of pyrethrum powder, four ounces to a gallon of water, or white hellebore of the same strength, poured around the root of each plant after drawing away the earth right down to the roots, will destroy any maggots which may have started work. The earth should be put back again and the plants hilled up, when new rootlets will soon be formed. A light sprinkling of nitrate of soda will encourage a quick growth and help the plants to overcome attack."

For radishes white hellebore used as a powder and dusted along the rows once a week has given good results; and a carbolic wash prepared originally by Prof. Cook by dissolving one pound of hard soap in a gallon of water and one-half pint of crude carbolic acid added, then the whole is boiled together for a few minutes to make a stock solution, which should be diluted fifty times with water when required for use. This solution should be sprayed upon the plants once a week from the time they appear above the ground until ready for use.

White Grubs. These are the well known larvæ of June Beetles. The adult beetles deposit their eggs just below the surface of the ground and the grubs hatching feed on the roots of plants for from two to three years. In Bulletin 44 of the Illinois Agricultural Experimental Station, Dr. S. A. Forbes states that the grubs do not change to pupae until June and July of the third season,—the perfect beetles transforming in September but not emerging until the next spring. White Grubs are often very abundant and injurious in garden plots, but a good rotation of crops will do more than anything else to control these insects. Dr. Forbes claims that as the white grubs have an opportunity to develop only in sod land and do not seem to relish the roots of clover plants, it would be well to bring strawberries or corn late into the rotation. He recommends a short rotation in which rye is sown on the broken-up sod, then seeding to clover the following spring, followed by the small grains, and this followed again by corn or potatoes. If such a method, or a similar one, be adopted in gardens, very few complaints would be heard regarding attacks of white grubs. When white grubs are known to infest lawns, kerosene emulsion may be applied with advantage, if followed by copious watering.

Fruit Insects.

The Peach-Tree Borer, (*Sanninoidea exitiosa* Say (Fig. 73) is quite prevalent in many of the Niagara peach orchards, as the brown gummy masses about the bases of the trees testify. These exudations are composed of a mixture of earth, larval excrement, and borings, and sometimes they extend entirely around the tree. The borer is the grub-like caterpillar of a beautiful moth, and works in the inner bark of the lower trunk or a large root, excavating a tunnel.

The life-history is not yet well enough known to the peach growers. The moths appear from July to September, and the females deposit their eggs on the bark of the trunk near the ground soon after their emergence. The larva hatches in a week or so and begins to bore into the trunk, feeding and forming its burrow until winter sets in, when it hibernates. In May the larva begins again to feed, and reaches full size in June or early July. It leaves its burrow then, and forms a dirty brown cocoon at the base of the tree. As a pupa within this cocoon, it remains about three or four weeks, when the moth emerges.

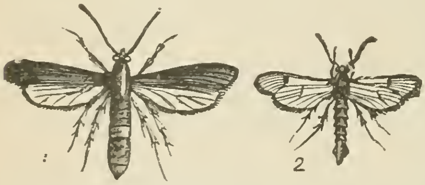

Fig. 73. Peach-tree Borer ; 1, female moth ; 2 male moth.

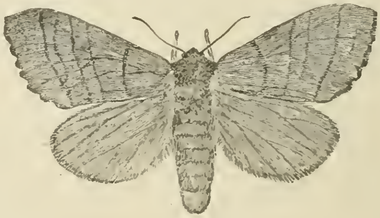

Fig. 74. Datana moth.

The old-fashioned method of "digging out" or "worming" the borer is perhaps the best that has been devised. The best time to do this work is in spring and fall, and it must be thoroughly done on all the trees.

The practice of "mounding" the trees in early summer is frequently recommended, as it compels the deposition of the eggs some distance above the ground, and the chances are that the birds and predaceous insects devour the young larva before it has a chance to bore into the trunk.

Wrapping the trunk with tarred paper in July and washing the trunk twice with a thick wash composed of "two quarts of strong soap, a half pint of crude carbolic acid in a pail of water with enough of lime and clay to make a thin paste," are methods often used by fruit-growers with considerable success. These methods will give best results if they are made auxiliary to the worming process.

The San Jose Scale (*Aspidiotus perniciosus* Comst), has extended its area considerably during the year, not only in the Niagara district but also in the south western part comprising the counties of Kent and Essex. In the latter region little or nothing is being done by the owners of the trees to control the scale, so that its spread has been very rapid.

In the Niagara district there are now areas thoroughly infested which the inspectors three years ago reported "clean." The number of dead and dying orchard trees is becoming larger every year, and many fruit-growers have had to go out of business because they would not spray.

In another article in this Report I give an account of some experiments which Mr. P. W. Hodgetts and myself conducted to determine the efficiency of the newer scale remedies.

The Codling Worm (*Carpocapsa pomonella*) was perhaps not so destructive this year as usual to apples. The Fruit Marks' Act is in many instances compelling apple-growers to spray their trees, for XXX or No. 1 fruit must be practically free from worm and scab.

The Rose Chafer (*Macrodactylus subspinosus*) (Fig. 30) appeared in large numbers in one or two peach orchards along the lake shore in the Niagara district. This insect is a brownish, long-legged beetle, and breeds in sandy, undrained meadow land. The eggs are laid in the ground and the grubs feed on the roots of grasses. By autumn they reach full growth; in spring they pupate and the adults emerge in June or July. Sometimes these beetles fly in hordes to adjacent vineyards and peach orchards, where they devour the foliage and eat holes in the young peaches. Under such conditions little can be done for arsenicals do not seem to have much effect in diminishing their numbers. Usually they disappear as suddenly as they came. The only remedy to prevent future recurrences of these beetles is to break up and cultivate the meadow land, their breeding places.

The Apple Maggot (*Trypeta pomonella*) is a serious enemy of apples in the eastern part of the Province and Quebec. Its work is readily recognized, as the maggot tunnels the pulp of the apple in all directions, thus rendering it worthless. The adults of these maggots are two-winged flies. They make their appearance in early summer and deposit their eggs through the skin of the apple. The maggots on reaching maturity crawl out of the apple, and transform to pupae in the ground, where they remain all winter.

Spraying as a treatment for this insect is of little or no value. The fallen apples and those infested with maggots should be fed to hogs; in fact, where these maggots are present every year, the hogs should have free run of the orchard.

Grape-Berry Moth (*Polychrosis viteana*, Clemens). (Fig. 34). While engaged in carrying on spraying experiments in vineyards in the Niagara district this season, we found many cases of grapes which were infested with a small dark caterpillar. This caterpillar was quite abundant in some vineyards and was evidently doing much harm. We were not able to work out the life-history of this insect on account of the limited time at our disposal, but we glean the following information from Bulletin 231, "The Grape-Berry Moth," by Prof. Slingerland of the Cornell Agricultural Experiment Station, November, 1904.

The winter is passed in the pupa state in the cocoon, which is most commonly observed on damp and decaying leaves near the ground under the vines. About the first of June the moths escape and deposit their eggs, probably on the stems of the blossom clusters. The early caterpillars begin feeding before the grape blossoms are fully opened, and they often destroy the bud blossoms. Throughout the blooming period the caterpillars continue to work and destroy many of the young developing fruits. This first, or spring, brood of caterpillars feed on the outside of the blossoms and berries, and are thus readily treated with poisons. By July the first most of the caterpillars have reached full size and soon make their peculiar cocoons out of leaves fastened together by silk threads, and lined on the inside with white silk. Within three or four days, the caterpillar, after forming its cocoon, transforms into a pupa, and a couple of weeks later the moth begins to emerge. Eggs are again laid for a second brood, and this summer brood of caterpillars works during the latter half of July and August. The eggs of the summer brood are laid on the skin of the green berries or on the stems. The most injury is done by this second brood of caterpillars, since in Ontario vineyards the number of the second brood is very large. Many of this summer brood become full grown in August and form their characteristic cocoons and develop moths by the first of September. Some, however, hibernate as pupae, so that there is only a partial third brood in the autumn. Some of the caterpillars of the third brood are full grown before October the first, and transform to pupae within the berries, but most of them make their characteristic cocoons on the leaves like the earlier broods.

Prof. Slingerland recommends the following treatments for the Grape-Berry Moth:

(1) The destruction of fallen leaves. As has been stated, the cocoons winter over on the leaves near or on the surface of the ground. It is evident that the gathering and burning of fallen leaves will destroy the great majority of the cocoons. He also advocates early cultivation, especially the land along the trellis under the vines, in which case many of the hibernating pupæ will be buried and destroyed.

(2) The bagging of clusters of grapes, by putting paper bags around the clusters soon after they have set. This is practicable only to a limited extent, but many grape-growers find that it pays to bag many of their choice grape clusters.

(3) The picking of infested berries in August. It is a comparatively easy matter to detect grapes infested with the Grape-Berry Moth caterpillar, and when such berries are picked and destroyed, much injury can be averted and the surrounding grapes can be saved.

(4) The application of arsenical poison sprays. Experiments were conducted in the Chatauqua district during the last two or three seasons, and successful results have been secured from the application of arsenical poisons, and Prof. Slingerland strongly advocates their use in infested vineyards, but states that the poison spray is effective only against the spring brood of caterpillars working in the blossoms, and recently set clusters. He advises two applications at the rate of four pounds of arsenate of lead in 50 pounds of water or Bordeaux Mixture. The first application should be made before the blossoms open and the second just after the blossoms fall. Now that many of our grape-growers are using Bordeaux for the control of the Black Rot and the Mildews, it is an easy matter to add the arsenical poisons to this mixture, so that the Grape-Berry Moth can be controlled at the same time as the fungus diseases.

SHADE TREES.

The Spiny Elm Caterpillar, the larva of the Mourning Cloak butterfly (*Euvanessa antiopa*) was more numerous than usual this summer on elms. This caterpillar is not often sufficiently numerous to attract attention, or to destroy foliage. The different stages of this insect are interesting. The winter is passed as a butterfly, and almost any bright day it may be seen flitting about as if it enjoyed the sunshine. Its wings are of a dark, rich purplish-brown color with yellowish borders, dotted with brown. Its eggs are beautifully sculptured, and are laid in compact clusters about a twig. The caterpillars are salt-and-pepper colored with a row of red spots along the middle of the back, and their bodies are protected by many branched spines. Their chrysalids are also spiny and they occur suspended by the tail.

The caterpillars of the *White-Tipped Moth* (*Edema albifrons*) were also very abundant this fall on the leaves of the hard maple about Guelph. They are readily recognized by their smooth, shiny body, by the numerous fine yellow and black stripes, and by the orange-red head, and the orange-red hump near the end of the body.

The Walnut Datana Caterpillars (*Datana Sp.*) (Fig. 74) were very numerous on walnut trees in the south western part of the Province in August and September, and in many cases stripped the trees of their leaves. These larvæ when full grown are about two inches in length. To the owners of shade walnuts and hickories the habits of these caterpillars are rather mysterious. When disturbed the caterpillars raise both ends of their bodies to assume a threatening attitude. They feed in colonies and at moulting period they descend the trunk of the tree and congregate in a large mass. When full grown they descend to the ground to pupate, hence their mysterious disappearance at this stage. The moths are brown, with bars crossing the front wings, which may expand one and three-quarter inches.

These caterpillars can be readily poisoned by Paris green applications, and at moulting periods captured *en masse*.

Fall Web-Worms (*Hyphantria cunea*) were more numerous this year than usual. Usually the webs are confined to forest trees, but this fall their webs were observed in many vineyards, on currant and raspberry plantations, and in apple orchards.

Their webs are unsightly objects, especially when they are large, and become filled with dead leaves, moulted skins, and excrement. The caterpillars differ in their habit of feeding from the Tent Caterpillars, as they always feed within the web. Moreover, they are very variable in color and markings,—some having a black band along the back and long white hairs, while others have two rows of prominent black marks instead of a band, and have shorter hairs.

The pupae are formed within cocoons, and are usually found at the surface of the ground, mixed with dirt, in crevices of bark of trees, under fences, &c. The moths appear in early summer, and the eggs are deposited in flat masses on the under surfaces of leaves.

There is but one brood a year in Ontario. Two or three lines of treatment may be adopted against the Fall Web-worm: (1) to spray the caterpillars with arsenical poisons, such as Paris green or arsenate of lead; (2) to destroy the webs by burning them on the tree with a torch; and (3) to clean up all refuse so as to destroy the hibernating cocoons.

The Cottony Maple Scale (*Pulvinaria innumerabilis*) was even more destructive this year than last, having been reported from many towns in the western peninsula. Briefly, the life-history is as follows:—The females winter over on the twigs, and in spring begin feeding and secreting a cottony mass for the reception of the large number of eggs which are laid at this time. The larvæ soon hatch by the thousands, and swarm over the leaves and twigs. They soon become fixed and begin forming a scale-like covering. In August they become mature, and usually in September females are fertilized by the males who die soon afterwards.

Treatment is rather difficult, but much may be done by spraying the trees with the kerosene-soap emulsion at the time the larvae are crawling. Success has followed the application of strong streams of cold water in spring, when the eggs are dislodged from the cottony mass and are destroyed. In some cases winter and spring pruning is beneficial. It is very probable, however, that the insect enemies of this scale will soon get the upper hand and keep it in check.

The Spruce Gall Louse (*Chermes abietis*) is extending its range every year, but in the older sections the parasities are apparently keeping it in check. There are two broods annually; the eggs of the first brood appear in May in fluffy masses on the affected spruce twigs, the second in August.

Judicious pruning when practicable, and applications of kerosene-soap solution in May when the larvae are hatching will do much to prevent the spread of this insect.

The Tussock Moth (*Orgyia leucostigma*) was very injurious in our large cities, but much information has been written in this and previous reports regarding it, and it is only necessary here to note its occurrence.

REPORT OF THE BRITISH COLUMBIA BRANCH OF THE ENTOMOLOGICAL SOCIETY OF ONTARIO FOR THE YEAR 1905.

The fourth annual meeting was held February 6th, 1905, at the Queen's School, Vancouver. There were present Rev. G. W. Taylor (President) in the chair, T. Wilson (Vice-President), R. V. Harvey (Secretary-Treasurer), A. H. Bush, R. S. Sherman, R. Draper and J. Towler.

The minutes of the last meeting were read and approved.

The Treasurer presented the balance sheet for the year 1904, which was passed.

The retiring officers were re-elected for the ensuing year.

It was unanimously resolved that the British Columbia Entomological Society should become an affiliated branch of the Entomological Society of Ontario, and the Secretary was empowered to conduct the necessary negotiations.

The Society now numbers nineteen active members; eight of these reside in the neighborhood of Vancouver, but the rest are so widely scattered through the Province as to make representative gatherings difficult, and severely handicap co-operation in entomological studies.

Individual members, however, have done good work, and the forthcoming list of B. C. Lepidoptera, compiled by Rev. G. W. Taylor, besides his papers on our Geometridæ, which will appear shortly, will show how much has been accomplished in the last few years.

In other orders various members are rapidly accumulating valuable notes and extensive collections: in the Coleoptera, Messrs. Taylor, Hanham, and others; in Hymenoptera, Mr. Venables; in Diptera, Messrs. Venables, Sherman and Harvey.

The season of 1905 was not notable for either abundance of insects or particularly interesting captures. It is worth noting that a moth hitherto regarded as extremely rare, *Lepisesia flavofasciata*, var, *ulalume*, Strk., was taken in some numbers both by Mr. Taylor at Wellington and by several Vancouver collectors round cherry and apple blossom in early spring. Mr. Venables of Vernon records the capture of a specimen of a fine Sphingid, *Marumba modesta*.

R. V. HARVEY,
Dec. 30th, 1905. *Hon. Secretary-Treasurer.*

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ANNUAL REPORT

OF THE

Bee-Keepers' Association

OF THE

Province of Ontario

1905

(PUBLISHED BY THE ONTARIO DEPARTMENT OF AGRICULTURE, TORONTO)

PRINTED BY ORDER OF
THE LEGISLATIVE ASSEMBLY OF ONTARIO

TORONTO
Printed by L. K. CAMERON, Printer to the King's Most Excellent Majesty
1906

WARWICK BRO'S & RUTTER, Limited, Printers,
TORONTO.

To the Honourable WILLIAM MORTIMER CLARK, K.C.,

Lieutenant-Governor of the Province of Ontario.

MAY IT PLEASE YOUR HONOUR:

I have the pleasure to present herewith for the consideration of your Honour the Report of The Ontario Bee-Keepers' Association for 1905.

Respectfully submitted,

NELSON MONTEITH,

Minister of Agriculture.

TORONTO, 1906.

Ontario Bee-keepers' Association.

OFFICERS FOR 1906.

President	H. G. Sibbald	Claude.
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Second Vice-President	F. J. Miller	London.
Secretary	W. Couse	Streetsville.
Treasurer	Martin Emigh	Holbrook.

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8. James Armstrong, Cheapside.
9. R. H. Smith, St. Thomas.
10. Geo. A. Deadman, Brussels.
11. F. J. Miller, London.
12. Dennis Nolan, Newton Robinson.

Auditors.

J. L. Byer, Markham.

E. Grainger, Deer Park, Toronto.

FINANCIAL STATEMENT.

Receipts.

Cash on hand from previous year	$ 38 31
Members' fees	176 00
Legislative grant	500 00
Legislative grant to Fruit, Flower and Honey Show	200 00
Affiliated Societies' fees	54 90
Use of stenographers' report	12 00
Total	$981 21

Expenditure.

Grants to affiliated societies	$200 00
Cash paid for prizes, Fruit, Flower and Honey Show	185 00
Expenses for convention	2 00
Officers' salaries	75 00
Directors' fees and expenses	151 06
Postage and stationery	19 22
Printing	12 25
Judges' expenses	9 00
Periodicals for members	103 35
Cost of reporting	50 00
Committees' expenses	48 25
Caretaker, Honey Show	15 00
Auditors	4 00
	$874 13
Balance on hand	107 08
Total	$981 21

Examined and found correct this 16th day of November, 1905.

J. H. Thompson,
J. L. Byer,
Auditors.

H. G. Sibbald,
President.
Martin Emigh,
Treasurer.

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Taylor, Mrs. Alex., Paris.
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Wood, George, Wesley.
Wood, Samuel, Nottawa.
Wilson, W. L., Elmvale.
Wheeler, Lawrence, Brussels.
Walton, W. S., Scarborough Jct.
Walsh, Austin M., Young's Point.
White, F. E., Inverary.
Webster, Thos. J., Oakwood.

Ontario Bee-keepers' Association.

ANNUAL MEETING.

The Ontario Bee-keepers' Association held its twenty-sixth annual meeting in Toronto on November 15th, 16th and 17th, 1905.

The Secretary read the minutes of the twenty-fifth annual meeting held at Toronto, which, on motion of W. J. Brown, seconded by W. A. Chrysler, were confirmed.

PRESIDENT'S ADDRESS.

By H. G. Sibbald, Claude.

I am pleased to have the honor of welcoming you to the twenty-sixth birthday of the Ontario Beekeepers' Association, and being at present a citizen of Toronto, I also bid you welcome to the city.

We meet in convention annually to talk about all pertaining to the little bees and the honey they gather, and I venture to say that no one outside of our fraternity can understand the pleasure it is to exchange ideas, and, copying from our pets, give pointers to others.

While we may be somewhat dogmatic, and think our own systems—the hive we use, the bees we have, and the honey they gather—better than those possessed by others. Still we learn much from these meetings, and as a rule you will find the members of our association expert bee-keepers and better posted on all pertaining to apiculture than those who have not availed themselves of the opportunity of joining with us and attending our meetings.

Since our last convention a very fair honey crop has been realized, especially in the western half of our Province; prices have been fair, and the demand good, so we meet under most favorable circumstances, and, like bees in a good flow, are good natured.

Our honey show, which was inaugurated last year, has now become an annual event, and the exhibition in the hall at present will do credit to our product, and do much to bring honey more prominently before the people of this city and the Province besides stimulating a worthy rivalry between bee-keepers to produce something better than has been.

The holding of this exhibition in Toronto will tend to centralize our meetings, and it might be wise for us to consider means whereby a number of first-class successful bee-keepers might be sent, or be available, to attend the local affiliated societies, thereby keeping these societies in closer touch with the mother society, and at the same time add interest to their meetings.

Apiculture is advancing. Bee-keepers are adopting short cut methods which makes it possible for one man to attend two or three hundred colonies where a few years ago one hundred would have been considered sufficient, producing then by twenty to thirty thousand pounds when ten thousand would have been considered big work.

And while we are considering ways and means of cutting corners we must not forget that a larger output will require a bigger market, else prices will go down. Our Association has here a field for work—to advertise and educate the public to eat more honey. If people only understood how delicious and wholesome, how cheap and economical honey really is they would use it far more largely as an every day food. How many people realize that five pounds of honey can be obtained for the same money that two pounds of butter costs, that many children would prefer it to butter to spread on bread. Thirty cents will buy a quart of honey and it will go further than two or three quarts of fruit. We should all cultivate and create a better home market for honey. It can be done.

Your program committee have done their best to provide a program, including subjects of live interest and importance to bee-keepers at present, and it is the wish of your officers for 1905 that the most profitable convention that has been will be the present one.

Mr. R. H. Smith: I don't know that I can add very much to what the President has said. We are glad to hear the crop is better this year than it was last year, so far as the western part of the Province is concerned. There are certain parts east of Toronto, however, where the crop has not been so good. As one of the oldest members of this Association I might say that I have attended nearly all the meetings since 1880, and I have always found them profitable, not only with regard to what we can learn about bee-keeping, but we meet with bee-keepers that we don't see at any other time. I find that meeting them here is better than hearing them through the *Bee Journal*. As our President has said, it is the means of taking the bee-keepers in short cuts, and letting them know of new methods, and unless we keep the market up to the production the prices are sure to go down. I don't think it is necessary that prices should go down. They are low enough now. People are only beginning to get acquainted with the value of honey, and when it becomes better known it will be more popular, especially if the quality is better. That is one of the things we have to consider. That has been one of the causes why honey has not been used as freely as it should be used I have heard that if you put a good quality of honey on the table it disappears very quickly, while it is hard to get rid of a second or third class article. Now the advance in the quality of honey during the last few years has been very marked. I remember about twenty years ago when we got what we consider now second or third class honey, we thought it was first class honey, both in comb and extracted. So that is a point for us to consider. I think if you examine the exhibits in the hall you will find that the quality is as good as anything ever shown in any exhibition on this side of the line.

DIFFUSING APICULTURAL KNOWLEDGE.

By Prof. F. C. Harrison, Guelph.

I usually come before you with rather a technical subject, but this year I thought that perhaps it would be better for me, as I was making my exit from my position as a director of the Association and representative of the Agricultural College, to make my remarks a little more general than I have been in the habit of doing; and so, instead of speaking to you on a subject that causes so much discussion in these meetings, that of fowl brood, I thought it better to say a few words about the means of diffusing apicultural knowledge. This is a subject that I have been thinking of for the last year or two, and I have been led to think about it, because I fancy this Association is not doing all it might do to help bee-keepers, especially beginners, in the various parts of the Province. Now what means has the Association for getting their reports of the convention, and the knowledge of the experts who attend these meetings before the people? First of all you have by means of your publication. There is a first class journal, the *Canadian Bee Journal,* and there is your annual report.

Are there not many who are interested in bee-keeping, who would be benefited very greatly by some knowledge of bee-keeping as given in these journals. Let me instance first of all with regard to the *Canadian Bee Journal.* I don't want to take the editor to task, I don't wish to find fault at all, but as I am going out I think it is a fine opportunity to let you know what I am thinking of, and I hope I will not do injury at all by making the remarks. I think the *Bee Journal,* first of all, might increase its size and give us more of what is going on abroad. Now, I believe that a great many extracts are made from the American bee papers, and they should receive first place because their conditions are much the same as we have here; but at the same time there are many articles coming out in European journals, which I think should find a place in the *Journal* here. And then I think there should be something every month for beginners. That has taken place in some numbers of the *Journal,* but there are always beginners and you must remember that although they seem old facts to you there are a great many who would receive benefit from them. The same applies as to the report. The thing that impressed me in the last meeting was the address by Mr. Hoshal. That address commended itself to me as being very plain, very practical, and something that was altogether needed, not by you particularly, but by those who should like to get an idea of bee-keeping. I shall again have reference to that. That address will lead me on to another point which I wish to make. This meeting is the only one which this Association conducts during the year, and I think that is a great mistake. I attended this year a meeting of another society, and during the meeting an enthusiastic member got up and said they should have more than one annual meeting a year. (Laughter.) But I think there should be more than one meeting a year of this Association, and if not more than one meeting something should be done by the Association through the Department of Agriculture, perhaps to bring this to the attention of the fruit growers particularly, and those who are interested in seed education and the farmers generally. Now, I mention those especially, because the fruit growers should be very much interested in the bees, because of the fertilizing power of the bee; and that is also true of the seed grower. You have in that association an organization through which the Ontario Bee-keepers' Association could work with great advantage. In the fruit growers' meetings during the year, in the spring and during the summer at the various orchards for demonstrating the best method of spraying, it would be very easy for this Association to recommend speakers at those meetings to give them something about apiculture, and something about fertilization, and about how to raise bees and produce honey. And also at other times of the year they have meetings. These are the times when you want to go right out to the farmer and give him some instruction at the same time. There you have an organization ready to hand, and all you would have to do would be to nominate certain speakers who would give a plain straight-forward account of the subject that you think should be laid before them.

Perhaps the first thing would be the suggestion that bees do not hurt the crops of the farmer but are good for them. There is an impression of the opposite kind around as some of you are aware. Well, that is one thing you could do for the Association. Then the next year you could give them instruction on bees, and the raising of bees—the best method—such an address for example as Mr. Hoshal gave here. I might say that Mr. Hoshal's paper was particularly interesting to those who wished to go into bees on a little larger scale and use the case system, but the second year's instruction should be given along a well defined line. Let the speakers come together at the beginning of the season, and all get primed along those lines. Then you send them out.

Then during the winter we have another organization, that is the Farmer's Institutes. We have speakers going out there all through the Province, and why not have several representatives of the Bee-keepers' Association going out with those delegations in certain districts of the country where they think bee-keeping would be successful, and there give them instruction as to the proper care of bees. I think this is work which the Association could very well undertake. It would not only increase the membership of this Association, but it would also be a material aid to the farmers. It would give them another side line. It would also be a direct benefit to the fruit grower and the seedsman and the seed grower in the way I have already indicated.

Then the third method is that the Association send out well qualified members of the Association to the meetings of the local societies. There should be no difficulty to get speakers, provided of course you have sufficient funds to carry all this work on. Send out speakers to certain local conventions. There are local societies scattered all over the Province, and I am sure that a number of speakers from the Agricultural College would help in this work, and would give their aid in addressing meetings of the strong local societies. These local societies are very valuable as they are feeders of this central organization. So I think that is a third line upon which the Association might spend more time.

I have already spoken in a brief way of the kind of demonstration, but whatever you do let the Association send out the very best men possible. It is no good sending out a man who doesn't understand his business. Let him be able to present it in a clear straight-forward manner, and who can give information if the Association needs it, along lines upon which they are not posted: that is, for example, about the fertilization of flowers and the fertilization of those plants which are grown of seeds. Now, upon these lines probably the College at Guelph would be able to help you, although the Association, I am quite sure, could name off half a dozen members who are qualified to give addresses on the production of honey for extracting or for comb. I make these few remarks, and I hope you may be able to do something along these lines. This is the last meeting at which I shall be able to be present with you as a representative of the Agricultural College at Guelph. I have already left the College. I wish you all very great success upon the lines you are following. (Applause.)

The PRESIDENT: We are glad to have this address from Prof. Harrison, and I am sure even if he does go down to the other Province, we shall be glad to have him with us again. The ideas that he has put before us are good in some respects. There are some of us who might think we didn't want so many beginners. But I will tell you one thing we do want and we could use that machinery, and that is that every man who keeps bees ought to be educated as to how to keep them right, and how to produce the best kind of honey.

Mr. HOLTERMANN: While Prof. Harrison was speaking I jotted down one or two thoughts that struck me, and one was that of getting more information from sources other than our own continent. I regret very much that we are not more in touch with European and so called foreign bee literature, and if anything could be done to have these articles translated from the various languages and published in our *Bee Journal* we might get a good many valuable points. Perhaps we have been too much of the opinion, though perhaps in a sense correctly, that on this continent Canadians are second to none along the bee-keeping line. I am not going to contradict that, but when we go to Europe and get men there with time and means to investigate these subjects carefully we get a class of men rare in this country, and I know I get practical hints from the foreign bee journals which I value very much. Then the next subject, having more than one meeting during the year. We in our section of the country are trying to do certain things. The first is to have meetings quarterly—that is the County Bee-keepers' Association. Then in the winter we have had district bee-keepers' conventions, and at these meetings practical things have been discussed, the various counties meeting together and having discussions. I hope the different counties will try to get together and discuss the practical questions that come up. It would be a great help to you all. Then as to the value of the bees in fertilizing plants. That is an important subject, one that we cannot talk too much about. I have come down here with the intention of bringing before you the desirability of getting the Government to carry on some experiments to show the value of the bees in fertilizing clover and buckwheat, and so on; and to also notify all who have any evidence to the contrary to bring it along, and have it all printed at the same time. That would give a fair chance to both sides, and show the value of the bees in this regard. I could give you some things that are said that would startle you, about the damage that crops derive from the bees visiting them; and there are some here who could tell you of people who say the same thing. Now this year we find that in some places the alsike clover yield has been varied. In some places it has been good, and some places it has not been worth threshing, and I have found in every case that the large yield has been in localities where bees were kept. I have three apiaries, and one man with whom I had the bees, said to me, "Well, Holtermann, I don't know what has done it, but I never in my life had a better yield of alsike clover, and at Jarvis the alsike clover wasn't worth threshing." A man at Burford said to me, "This fall our alsike clover has amounted to nothing, and," he said, "I know why it is. We haven't got bees in our section. Can't you put some bees in our neighborhood?" But there are men who say that the bees are a positive disadvantage to the clover seed and the buckwheat. They say the bees take the strength out of the buckwheat, and so we have these things to contend with. There was one point that Prof. Harrison has spoken of that is a rather sensitive one. In a sense it just depends on how we understand it. I claim that we don't want to do too much in the direction of getting more bee-keepers; also we are suffering from the fact that bee-keeping is not made a business. It is looked upon that anyone can keep bees, and they keep them in a slip shod manner to a very great extent. We want to impress upon the people that there is very much to learn, and that it is a business, and then teach them how to produce a good article, and in doing that we can have more permanent bee-keepers than at present and we will have a better product upon the market and consequently a better market, and when we do that we do something in the way of increasing the honey production. In our house we had some honey that everyone wanted until it was finished. Then another lot a little off, and yet not a bad honey, was put on the table, and that jar lasted three times as long as the previous one. The public should be taught how to judge honey, and if that could be done it would compel bee-keepers to produce a better article, and if they did not they would have to go out of business.

Mr. Evans: I would just like to say that this Association has done something along the lines that Prof. Harrison has spoken of. When I was president we got up a statement showing the advantages of the Association, and showing a great many things in connection with bee-keeping that should be useful, why they should join the society, about the Foul Brood Act, and all that sort of thing, and we had them mailed to the bee-keepers, but it seemed to be a hopeless policy after all, for we only got one hundred members. So that it appears that the general public do not take very much interest in it. Then we had the lecture by Prof. Fletcher with reference to the fertilization of flowers, so that the bee-keepers have been doing something. I am quite in accord with the President that we do not want to go out in the highways and hedges and compel the people to become bee-keepers. I think if we went out and induced a large number people to keep bees we would find in a very short time that we would not be able to sell our honey. People make a mistake in comparing honey with cheese and butter, and things that have a good foreign market, for we find that honey has not a good foreign market. There have been times when honey has only brought five cents a pound, and any large increase in the production of honey would produce a glut in Ontario. I think the best way is to instruct a man how to keep bees and produce a good quality of honey, and on that line I think the address was a very good one.

Mr. W. A. Chrysler: I have been thinking for some time of education and educational advantages, and I think they should start with the young. You take the most successful bee-keepers in this country, or in any other calling, and they generally started young. I think this is a matter. affecting the Boards of Education for the Province. I think every vocation in this country should be presented in all its phases in every public and high school, and each child can then start on a calling which he takes a fancy to or prefers. He takes great interest in that one line, and becomes enthusiastic in it, and when he follows it up he makes the most possible out of his chosen calling. Having started on one of those callings—bee-keeping for example—I would then adopt Prof. Harrison's suggestions, and I think we should do all we can to conduct ourselves and help each other in every possible way. But I find out that a man who starts out late in life in any vocation usually makes a failure of it, and in no other vocation does he make a greater failure than in bee-keeping. I have noticed that about nine out of every ten who commence bee-keeping fail in it.

Mr. R. F. Whiteside: There are one or two points in the discussion that impressed me, and one was with reference to holding the meetings. Where two or three counties are holding meetings, if they could arrange them on consecutive dates, Wednesday, Thursday and Friday for instance, then we could arrange to attend those meetings in succession. Now a man who might be appointed could go to one place on the Wednesday, and then follow on for the Thursday and Friday. I think this would increase the attendance. In fact I attended one meeting last spring, and instead of finding about twenty or thirty there as there ought to have been, there were only four or five. We want something to make our meetings more interesting, and we would have a better attendance. It is very much like the religious meetings. If we were going to have some great man from England or China or some place at the meeting, we will have a house full: and I think that would be a good idea for our societies. With regard to what Prof. Harrison said about increasing bee-keepers, there are two ways of looking at that. Mr. Holtermann can either get more bees and put them out there, or he can tell somebody that there is a fortune in it. He could say there are thousands that never have honey, and if you don't get at it I am going to put my bees there, and that would make them think there was a business end to it. (Laughter.) Taking it from Prof. Harrison's standpoint, the Government ought to say to every individual who raises alsike clover for instance: "Why, it is a benefit to you; it is to your own interests to cultivate bees both from what you would get from the bees themselves as well as the extra profit you would get from the fields." I suppose I am rather voting against myself in seconding Prof. Harrison in this respect, but, as a Government official, I think he is on the right line. I think the Government should be supported in this . I don't know about the market, but I think we will sweeten up the people anyway.

The President: There is another question besides raising the best honey, and that is how to get them to eat more honey.

Mr. Deadman: One great point at the very begining is to educate a man so that he can tell good and bad honey; so that he will not take poor stuff, and then say that honey is no good. In this case you can be as wise as a serpent and as harmless as a dove. I have gone through most of these meetings, and I have come to the conclusion if you want to keep a man out of bee-keeping you can be perfectly honest and candid with him. Sometimes it would appear that to tell the truth is against your own interests, but impress upon them that while it will benefit them to keep a few hives it will drive other people out. That is the right way, and I believe in letting that thing take care of itself.

Mr. Geo. Laing: They say that self-preservation is the first law of nature, and if Prof. Harrison could demonstrate that by taking a whole lot more and making good bee-keepers out of them we could get ten or twelve cents a pound for all the honey we could raise, I don't think there is a man here would be so selfish that he wouldn't want to educate all the men in the country in the bee-keeping line. There are some of us make our living out of bee-keeping, and that living is small enough; and I am afraid that unless the market is developed along the same line as the bee-keepers are developed, or even a little more rapidly, that we will find our prices going down instead of up. That is the great thing I think at the present time, the price of the honey, rather than the education of the bee-keeper. We seem to have honey it is difficult to get a market for. If I was realizing about $10,000 a year for my honey I would say to Prof. Harrison, educate all the young people in the country, I am willing to share: but when we raise 10,000 pounds of honey, and find it impossible to get rid of it at eight cents a pound, we find our living is pretty small indeed without increasing the competition.

Mr. Pickett: I would like to ask a question: Does educating bee-keepers raise the standard of our products? If it does not, then do not educate them. But my impression is, the more you raise the standard the fewer bee-keepers there will be, and the better market there will be, from the fact that the article will be of a very much better quality.

The President: We look at this from different standpoints. The government gives us a grant every year, and their object I presume is for us to do as much along the educative line as we can and increase as much as possible the production of honey so as to enrich the country. Prof. Harrison has brought that side of it forward, and I suppose it is all right for us to look at it a little from the other side. Mr. Pickett says the higher we raise the standard the less people will think of going into it, and the more large bee-keepers increase their apiaries throughout the country the less chance there is for others. The large bee-keepers generally produce good honey, and if good honey is produced then the market ought to increase. I suggest that is one line we ought to go on, and one thing we ought to go right after, and that is some way of advertising honey and educating the people how cheap it is compared with other things, and how good it is.

Prof. Harrison: I don't intend to answer any of the various speakers who have rather spoken against education along the lines of apiculture. I think Mr. Holtermann struck the nail on the head in answering that question; but on the question of the market I might say a word. Many of the members of the Associations known as the Fruit Growers' and the Dairymen look to England for their market. All the material that was exported was sent to England, and I think the members of this Association have attempted to do the same thing with honey in the hope that England will be the best market. As I have lived in England for a number of years, I don't think that the average Englishman is a honey eating person, and we cannot go over there and educate the English. But although he is not a honey eating person, the people on the continent are, on the contrary, great honey eaters. Perhaps some honey shippers have erred in trying to get a market which they think is right, but which in reality is wrong. Perhaps we could get the French and the German and the Italian people. The French people are great honey eaters. Every breakfast they have honey on the table, and I know that honey, especially the better class of honey, is a very good price in these places. I just throw out this suggestion. Try and find out if there are not markets in these other places. It may be no use, but you have that much information anyway. I have said that the continental persons are great honey eaters. I have spent a great many years in Germany and France, and I have noticed that they compel the English visitors to eat honey when they go there, so they help considerably in trying to induce the Englishman to cultivate a taste for these sweet things. I thought I would mention it in the hope that something might be done to find another market for the very excellent honey that is produced here.

Mr. Hall: I find as an exporter of honey it costs too much to get honey to these people. They like the honey, but the expense eats up all the profit there might be in it.

Mr. Holtermann: It brings up another very important point. Just so long as we bee-keepers say that anything is good enough for us—anything is good enough for the bee-keepers—we are quite contented. Mr. Hall has handed me a German letter to translate and read to you. The letter is in reference to a large firm in Germany who write over and say they have seen our beautiful Canadian honey at the Liege Exhibition, and they would like to get a price on it; not only on the best honey, but also on the inferior honey, and if we give the bottom price they can buy in extensive quantities, and they want the business. We all agree that the Britisher is not a honey eater, but when you take the immense population over there, the nation is an extensive honey consumer. They know nothing about our honey, and so long as that is the case you won't get a market and you don't deserve a market.

Mr. McEvoy: I think the English honey dealer is the best honey dealer on the earth. I have nine samples from England and really it is like hair-splitting work, the body and everything is so close. They make a big difference in the price. There is no use saying the British market is not a critical market, because they get the best honey over there that it is possible to get. They get honey that is well ripened, and they don't want any other. The California honey is on the British market, but John Bull is going to be the judge and they are able to judge all right.

Mr. Fixter: With regard to having speakers at the Farmers' Institutes, I think Professor Harrison's ideas are good. Educate the people to keep their bees right, and to put up their honey in the right way, and educate them how to get a market. I spoke of that idea, but it has never been taken up. I think this Association ought to appoint right now two or three men suitable for giving instruction at those Farmers' Institute meetings, and I think you will find it will be appreciated by the people.

Mr. Storer: I think one drawback to our market is the wholesale grocer. I went to one of the largest wholesale grocers here to solicit an order, and he got down several samples of honey from Jamaica and other places, and he told me it was laid down to them here at three cents, delivered to them here in Toronto. They would buy my honey, but they wouldn't pay me a fair price for it. They wanted it to mix with this other man's honey. I said, "Do you want to spoil my honey?" They said, "No; we want to make a universal grade," and I said, "No, you can't spoil my honey that way." It is that sort of thing that is detrimental to our market. I don't know whether any of you have had experience like that, but that was one of the largest wholesale grocers in Toronto. They mixed it with our good white clover honey, and they put it up in glasses and fancy forms and sell it. It is inferior honey and they sell it for first-class. They told me it was laid down at three cents.

Mr. Sibbald: I think they may have told you that, but there is a mistake about that somewhere. A person hasn't got to believe everything he hears in Toronto.

Mr. Storer: But when they offer you six cents for what other people are paying you eight cents for they will do anything. Of course I am not speaking of that particular firm.

The President: Mr. Couse sent some honey to the British market some time ago, and we would like to hear about it.

Mr. Couse: The reason I sent it was because we had considerable difficulty in doing business through the Exchange. I went to a wholesale firm in the city of Toronto, and I told them I would give them a certain amount of honey, and they could take it, and try it, and do the best they could with it. I told them if they could make use of it they could get 100,000 pounds of it. I gave them 2,600 pounds of honey, and I got back $57, and that is the sum and substance of it. For 1,000 pounds I got $57, and as for the rest it seems some Jew got the whole of it. They couldn't find him afterwards. One lot went to Liverpool and the other to London. I think it was Liverpool where the money came from. I don't know yet where the London man is. I took the risk, and so I paid for it.

Mr. Holtermann: Since we are on the market question, quite a few years ago we shipped some honey to a firm in England, and we put it in pound pails, and that honey netted twelve cents a pound over all expenses. I think there was something in the neighborhood of two car loads shipped. This firm wanted to have the sole agency, but at that time we thought we were going to have such a good thing in the British market that we wouldn't give it to them, and they quietly let it slip down, and it ended in that way. We have sent out some since that time, but all it netted us was about six cents or even a little less. That was the very best that could be got as far as I could tell, and the thing was a good article. It seems to me the thing is to get the proper connection. My idea is to put it up in the same way as nearly as possible as the British man puts it on the market. I am satisfied that if we could get the right connection over there there is still a good market for it. I entered into correspondence with a firm that had twenty-five houses, and they wouldn't touch it at all.

Mr. Couse: With regard to the proper line to get it in I felt that I was ignorant, and that the wholesale people in Toronto should know the best way. I thought they should have a good connection. I didn't think anyone would have better. They were large dealers, perhaps one of the largest in Canada.

Mr. McEvoy: California honey rules the British market. When you have a big crop send as much or as little as you like, but it is going to be guided by the California market.

Mr. Holtermann: Mr McEvoy is perfectly right.

Mr. Hall: It costs too much to get it from here. It costs sixty-seven cents a hundred to get it to England.

SYSTEMATIC ADVERTISING AND MARKETING OF HONEY.

By R. H. Smith, St. Thomas.

The marketing of honey, like the marketing of any other kind of produce, is a simple matter once that you have a regular line of customers and the reputation for a good article; but, for the beginner, or the producer who is a long distance from the principal markets, the question is often more troublesome than the production of the article. Of course it is easy to sell honey if you put the prices low enough or take about any price that is offered; but selling a No. 1 article of honey in this way is very unsatisfactory, because it is unprofitable. The producer should receive value for his time and labor.

I may not be able to add very much to what is already known on this subject, but I want to emphasize a few points as they occur to me on creating a market for honey; and perhaps this may bring out a little discussion. To advertise honey one cannot go about it in the same way as to advertise any special food product, for the simple reason that honey or nectar is a name for a sweet gathered by bees from the nectaries of flowers. Of course the bee-keeper might advertise clover, linden, buckwheat or other varieties of honey; these are general terms that any producer may use, but one cannot get up a fancy name for honey like the manuufactures of canned goods or breakfast foods.

The best form of advertisement I have found is a pleased customer; and and the best way to get and keep the customer is to supply a No. 1 article of honey at a fair price, no matter if it is at wholesale or retail. One might properly ask, "How can we secure the customers?" One plan is to canvass the surrounding country, or, if you have not time, an assistant might be engaged who would sell on commission. But go yourself if possible, and it is wonderful how many farmers will buy honey when it is brought to their notice. Talk it up. A buyer likes to talk to the producer who can speak of the goods he has to sell as if he understood them. Many bee-keepers make the mistake of sending their honey to the large cities that are perhaps already overstocked, when, with a little enquiry, there is already a market in the surrounding villages and country. Another plan is to make an exhibit at the township or county fair. It may be said that the premiums offered do not make it worth while. Here is an opportunity to become interested in the local agricultural society, attend their meetings and give them pointers when revising the prize list for honey. I have found that the directors are generally willing to encourage an exhibitor who will put up an attractive exhibit of honey. The ordinary exhibit of honey at the local fair only calls for an entry of from five pounds to ten pounds, and attracts no more attention than a can of fruit or pickles. Just try what an effect it will have to put up 100 pounds or 200 pounds of comb and extracted honey in clean white cases and clear glass jars, with a sign above stating it was from the apiary of the local apiarist. Many who had never thought of honey will be attracted by its beautiful appearance, and remark that they would like some of it. Demonstrate your honey by giving samples to prospective buyers, and have a supply to draw from put up in different sizes of cases, jars, and pails, neatly labeled, giving your name and address. Small packages may be disposed of in this way, that will, if the honey is good, bring inquiries for larger quantities. If possible take along an observatory hive of bees. It is a great attraction and never fails to draw the attention of the crowd to your exhibit of honey.

Call on the local dealers at regular intervals with a supply of honey in packages of various sizes to suit their class of trade. Do not press too large a quantity on them at one time; no up-to-date grocer likes to see a quantity of fly spotted packages on his shelves, but would rather buy in smaller quantities and have them clean and fresh.

If you have more than enough honey to supply the local demand, do not make the mistake of putting up your honey in what I heard a wholesale grocer term homespun packages. See that the sections are freed from propolis, properly graded and cased, and the extracted put up in well made cans. Nothing disgusts the commission man or dealer worse than to have a consignment of honey shipped to him, with the sections unclean and ungraded, with perhaps both cases or cases leaking badly, to which dust will adhere and spoil its appearance, making it so much more difficult to obtain the best prices.

By the accounts we read in the United States bee journals, many of the markets there, for honey are very dull, with slow sales and low prices. This is a discouraging state of affairs, when nearly every other article of food has a good demand at higher prices, and this, too, at a time when the demand for luxuries was never so great. It is not that the people do not like or want honey; it is mainly owing to so many silly stories published in the newspapers and magazines that they have to some extent lost confidence in honey as an article of food. Lax enforcement of the pure food laws is another cause for its decreased consumption. Happily in Canada we have comparatively little adulteration, and, although there is still room for improvement, the demand and use of honey has enormously increased during the past few years, and will continue to increase as its value becomes better known.

I brought some samples along just to show you some of the varieties that are put on the market. As far as appearances go you will notice there is not very much difference in this light, but if you go to sample it you will find a very great difference. This is what we call a No. 1 article (shows glass of honey). Here is another sample from the same comb, where you would think it was a different article altogether. Now I notice in the last issue of *Gleanings* that one of the writers advocates a system that we have been following of not putting any inferior honey into our No. 1, and to sell it for what it is. Keep them separate, and sell them for what they are. Many, I believe, will extract honey out of combs only half capped and mix it up with No. 1, and that only produces a No. 2 article after all. So try and have the quality right. Here is another sample, and I may say it is one of the main causes of destroying the confidence of people who buy honey in stores. This is a sample that I picked up in a store, as you see it has the name of the firm on it. I have had that for three years. I just keep it as a curiosity. Now, as I said, that is one of the principal causes of dissatisfaction. When you approach a person to buy some honey they will tell you that they bought some in the store the other day, and they didn't like it. I don't wonder at it if it is like that. That is one of the causes that there is not a larger demand. With regard to the statement that the wholesale men could buy honey from Jamaica at three cents a pound, I don't believe they could get it for any such price, because they can get at least that price for it there. They could not lay it down here at much less than a cent a pound, and the duty is two cents a pound, so you can see for yourself. With regard to the British market for honey, I was over there some two or three winters ago, and I made a number of enquiries as to the possibility of putting honey on the market, and I found that the Britishers were not educated to the use of honey except as a medicine. They will buy these small quantities at a higher price just to use as a medicine, or just occasionally. They do not use it as we do in Canada. They have not been educated up to it yet. Another reason why the market has failed there is that while we have a grand market for our dairy products and animal products, those things can be produced here very much better than in many other countries. But honey can be produced in other countries. There is a good deal shipped from Chile, Australia and the West Indies. There is a good deal of a lower grade honey sold there, too, though at a much lower price. But I think with the growing population and the growing market in the West, if we improve the quality we will not overstock the market. I think the price of honey is lower than any other article in proportion to its value now, so it will probably not go any lower in price.

Mr. Deadman: Mr. Smith spoke in connection with the disposal of honey, about the difficulty of living a long way from the market, and I think that is a difficulty with a great many. If we adopt the way of going around the country and canvassing, we find that the market is limited, although the farmers buy in large quantities when they do purchase. Sixty pounds to them is perhaps no more than ten pounds in the city. The bee-keepers in the country say that the customers who buy from them usually buy in large quantities. If we live near a city, it is a great advantage if we use it right. Mr. Smith says that the best advertisement is a good article, and I suppose it is. If your customers get the idea that you put up a good grade of honey it is a good thing for you. If it was a question of preventing swarming many of us could give something from our experience, but very few of us have had much experience in marketing honey. We have had experience on one particular line and not on another. I might say that my first experience was in the sampling line, and I believe that is the best way of disposing of honey, or rather of working up a market for honey. That is the way the patent medicine men adopt. I was in the drug business and during that time we disposed of a great many of the remedies in that way. I never knew a drug to sell yet that was not sampled. Now, sampling is a good thing, and I believe it is the best way of introducing your honey. I did this only on one occasion, and you might say my experience is very limited; but I didn't need it since. But if I had honey, and wasn't working it in a wholesale way, and I wanted to dispose of that honey, I would go into a city and I would sample in that city. This may be done in different ways. My own experience was with a little dish like that. (Shows small dish). An ounce of honey is enough for a sample. You can estimate the cost, it is very little indeed. In sampling with a dish like this you have to go back for it and that helps you to sell some of the honey. But I would put a circular in with it with some explanation. Some say you should bottle it, and talk about it. It is a good plan to go with your own honey. No one can talk about your own honey like yourself, but so far as sampling is concerned it would take too long to explain it. If you leave a sample in the house they will sample it, and then they will read your circular. The plan I adopted was, I went back again the next day. One of the difficulties I found when leaving the sample was that the lady was not in and you could not talk to her. But if you leave a sample in it will do its work some time. Give them a little time, because it is not advisable to go back the same day. You can easily understand that if you go to a wife she wouldn't care to invest without consulting her husband; and that is right. But you don't want to leave it too long. It is a very good plan to leave cards all ready to fill out: "Please send me so many pails of honey"—so many five pound pails, and so many ten pound pails—and all they have to do is to fill in the name and the quantity. Or you could deliver it right there if they want it. If you want to sell honey to the trade, get them to put the name of their grocer on that card. The only city I sampled was the city of Winnipeg. That might be an exceptional place, but I have been told since that it created a market there. The manager of a large departmental store there wrote me to go up, and he would give me an order.

In using a sample bottle of that kind you would want to go back the next day. The first order may not pay you financially, although it likely will if you manage it right, but we suppose that you will get other orders in the future, and you certainly will. One mistake the bee-keepers make is that they don't put honey high enough. They go to a house and offer honey at a wholesale price; that is a mistake. When you are selling honey that way you want your retail price, so that you will have a profit. If you sell to a merchant you have to sell to him so he can have a profit, and so with the wholesaler. I spoke to a farmer friend about selling honey, and he wouldn't give a cent reduction on the retail price. If the retail price is ten cents you should give it to the grocer for eight cents, and to the wholesaler the same.

Here is another sample bottle here. It would hold a quarter of a pound. That would not cost you more than three and a half cents. If you leave that sample in you should get an order for a ten pound pail from every second house you leave it in anyway, and the profit would pay for that easily. The beauty of that is you put them up at home and you carry them in a basket and put them in as you go along. In Toronto here you could single canvass many, all the honey you would care to deliver. With a bottle like that, I would recommend not going back as you did with the dish, and if you leave your name on that bottle it is a standing advertisement for you. But if I left a sample of that kind I would leave a blank post card in with our name, and all they have to do is to put a one cent stamp on it and have it filled out. Have your other literature, but have it impressed on them that you are going to deliver a certain day and ask if they would like a ten pound pail. The orders you would get, if you only got one in five, would pay you eventually. One party in Winnipeg said to me: "I like the way you do business; you keep up the quality, and don't reduce the price."

Here is another bottle. (Shows.) That is a ten cent bottle. It retails for that in Toronto here. If you sold that at a private house you would get ten cents for it. In leaving a bottle like that I would mark it as a ten cent sample of honey, and you tell them that you will call on a certain day and take their order, and you leave your cards or literature or blanks to fill out, and get your pay for the sample if they wish to keep it; if not you take the sample back. Now, it seems to me, there is not one house in Toronto that would not keep a sample, and that would probably pay you for your trouble. You might work it that any person taking a ten pound pail would get their sample free. I just throw these suggestions out. But in selling honey, I think selling from sample is the best way. Advertising is expensive work. The local papers don't cost much, but they don't go far enough, and it doesn't reach the people like a sample. In reaching people, I don't know any way better than sampling honey. In the first place, we want a first-class article, and in that way we get our name up. There is one thing about that education part. In all my travels I never met a man, unless he was a bee-keeper, who could tell how clover honey differs, They know that one man has bees and another man has bees, and one man's honey is better than the other; but they don't understand how clover honey itself differs. Once get them to understand that there is a difference in honey, the longer it is left in the hives and so on, and you will have no difficulty in selling your honey.

Mr. J. W. Sparling: This marketing of honey is an old, old subject. It is over twenty years now since I first commenced to read the American journals, and then they were looking forward to the time when it would be universally used. It was going to be cheap and the people were going to use it daily. That time will never come, from the very nature of the article. Honey is a sweet, and like all sweets, it cloys on the appetite, and you get tired of it. It is not like butter or cheese or beef. They do not cloy on the taste like a sweet. If a person has a sweet constantly before them they are bound to tire of it. Everyone does. And that is why I say that honey, from its very nature, can never be an article of daily consumption. Of course the sale can we worked up, and people will buy a little, and then they will drop it for awhile, and then take it again. But you can not keep people eating honey all the time.

Mr. Gemmell: I would like to ask Mr. Deadman, with regard to adulterated honey in Manitoba, if he had any trouble about Ontario honey —about its being supposed to be adulterated? I understand there is an idea among the Manitoba bee-keepers that the Ontario honey is adulterated. They say that tons and tons are being sent up adulterated, and is being sold as adulterated. If I understand it right it is the Manitoba bee-keepers who are circulating this report. I understand a gentleman went into a couple of stores there and he said he would give $200 to anyone who could find a pound of honey from Ontario adulterated. He fetched Mr. Smith's and Mr. Deadman's, and these were all right. He thought it would be a good idea if this Association would pass a resolution setting forth that the report was in circulation out there, and they wanted to give a denial to it, and send it to the daily papers in Winnipeg to print, so that the report would be counteracted. I am sorry that I have not the letter here, because there was quite a little information that I cannot remember.

Mr. Chisholm: I market quite a good deal of honey in Belleville, and my idea is to give your customers a good quality, and I never fail to get them to like it as a rule. I know I hold my honey up to ten cents a pound for either five or ten pound lots. The smaller lots I realize a little bit more for. Then, if I sell it wholesale to retailers, I give them a fair reduction, but probably not so much as I hear some people talking of. I give them about ten per cent. off. Then I have no trouble in my retail work.

Speaking of the adulteration of honey in Winnipeg, I may say I am confident it is done. I have a son out near Winnipeg, and he would sometimes get honey from the stores because he had been accustomed to it at home. But when he got it he would say: "That isn't like the honey at home; there is something wrong with it." I also knew a man in Belleville, who said he had made barrels and barrels of it, that it never saw a pound of honey. Those things I believe are true. The man told me it himself, and was laughing over it. He said if he could get some real good honey he would like to send it out there, but I didn't know at that time what he wanted to do with it; but I know a man who does take our honey to Manitoba. What he does with it I don't know. But in different places it is the cry that they can not get the honey as they see it in the market in my pails. So I am confident, so far as my knowledge goes, that there is tampering with it after it leaves the honest bee-keeper.

Mr. Gemmell: Then you think it is done in Manitoba? You don't think it is done here by the merchants?

Mr. Chisholm: I do not know much about the merchants here that sell it; but I know men there that buy it by the car load.

Mr. Gemmell: Of course there is some adulteration being done, and it is nothing but right for the Ontario people to let them know if they buy it in the right places they will get it all right. I have sent out some honey to Manitoba, and my trade is increasing all the time. I get a good respectable price for it, and I am looking forward to having all the work I can do. I have some orders at the present time that I cannot fill of ten pound pail lots, just because they have got acquainted with my way.

Mr. Darling: I want to say that some of this honey has found its way to Manitoba. It may be that some of those men who buy honey here take it out and mix it. There must be a difference in it of some kind. We have personal friends out there, and we send them a few cans as a present sometimes, and sometimes an order will come from some person he has mentioned it to. They will say, "I would like to get some of your honey; we cannot get any good honey here." I thought perhaps it was because they had a prejudice, but I know that the same people who bought ours buy again, and I have sent sixty pound tins. It is not a constant thing, but there is scarcely a year but I send out some honey there. Just the other day I had a letter from Winnipeg asking for quotations for both honey and wax, and I told them I had neither to ship. There is something wrong, but I think perhaps it is someone out there.

Mr. Smith: I believe that is quite possible, but as I have said several times, there are a great many bee-keepers who do not produce it as good as they might, but they send off anything they get in the way of honey. I was reading the the *Bee Journal* where a man was advocating taking it before it was capped at all, to save so much labor. That may be feasible enough in a warm, dry climate like it is in California and Colorado. but it is quite impracticable in this country. He advocated keeping it in a room where the temperature would be 100 degrees. Now, beginners might want to get large quantities, and even if they do not produce such a poor quality as this, they do not take the care they should in producing it. They ship it there and people who happen to get some of it say, "This is not like the honey we got when we were down East," and they suppose it is adulterated, where it might be only a poor class of honey. I know that where this adulterated stuff is put on the market they are on the lookout for these things. The grocer does not want to sell a poor article if he can help it. If you think it is adulterated, go and get a sample and get it analyzed. and if those grocers are advised that it is they do not give a second order One great difficulty is to produce a supply to meet the demand. The diffi culty is to get it good enough to keep it up to the standard when we have to get it from others. Sometimes at the bottom of the can it will be a very good sample, and higher up in the can it will be a different sample altogether. Mr. Sparling was speaking of honey being a sweet, and people tiring of it. It may be so in some cases, because people use it in the wrong way. We went into it to produce it for our own use, and we use it in the right way; but I know of some people when the best honey comes in they will take a large saucerful and try to eat it up at one meal and they sicken themselves for the whole season. That is one line of education that might be gone into. They ought to be taught that it is a concentrated article, and should be used in small quantities.

Mr. Pickett: It seems to me that the subject has resolved itself into this: First, produce a good article; secondly, be honest yourself; and thirdly, try and get a good sale for it. I sold the last of mine to Winnipeg people, and got ten cents a pound for it. Get it before the public with your name attached to it, so that they will know where to send for it when wanted, and be as regular in your visits as possible, so as to supply their needs when arranged, because many people do not wish to buy large quantities. I brought my last can to the station this morning to go to Manitoba at nine cents for the honey. or ten cents for the honey and can included. I have never taken less than nine cents a pound for my honey since I started producing.

Mr. Holtermann: I think we should do something with regard to this question of adulteration of honey in Manitoba, and I would move the following: "That we notify the Department at Ottawa that it has come to our notice that the western papers are circulating reports that the Ontario bee-keepers are selling honey that is adulterated; that they produce samples of the the Western papers are circulating reports that the Ontario bee-keepers are selling honey that is adulterated; that they procure samples of the honey, as we are confident that it has been done: that we would like to find out the sources of such adulteration, if any; and that the Winnipeg papers be notified of the resolution passed by the Ontario Bee-Keepers' Association, and the results."

Mr. Gemmell: I second that motion.

Mr. N. Smith: My son's father-in-law wrote me if I could buy him a few car loads of apples, and he asked me if I could name a reliable dealer. He also asked for honey. He said he could guarantee a large price for the apples, but he says they have got discouraged with Ontario. Now, I think that is just the thing. Of course we believe that the bee-keepers are straight. I say they are. I gave some people some honey a little while ago, and they came back and bought a hundred pounds. That is the way with all my customers. At Fair time I happened to drop into a corner grocery, and I picked up a can and said, "I want to get some honey, and I want to get it at eight cents?" The grocer said, "I could sell any amount at that price." I don't think we look around our own market enough. Perhaps if we did we would get more orders.

The President put Mr. Holtermann's motion, which, on a vote having been taken, was declared carried.

NOTES FROM THE EXPERIMENTAL FARMS LABORATORY, 1905.

By Frank T. Shutt, M.A., F.I.C., Central Experimental Farm,
Ottawa.

This year, owing to the increased work in connection with investigations in other branches of agriculture, we have, I regret to say, been able to devote very little time to the problems in bee-keeping that for their solution call for the aid of chemistry. In fact, it has only been within the past few weeks that I could take in hand the matters which were suggested for research at our last convention, and consequently the results which I have to present to night are somewhat meagre. They will, however, I trust, prove interesting and useful to you, since they refer to matters of greater or less importance to all bee-keepers.

The Factors or Conditions which Control the Candying of Honey.

Public opinion appears to be divided on the question of the condition of honey. There are those who will only purchase it so long as it remains fluid, and again others who desire it candied or solidified. Producers of honey have to study the demands of their customers, and seek to meet these requirements.

It would be well if the consuming public knew that genuine honey granulates or candies. This takes place generally not later than November. Candying, therefore, is a strong indication, if not a sure sign, of genuineness. The chief adulterant of honey is glucose syrup, which does not solidify. A honey, therefore, that remains permanently fluid may be regarded with suspicion, though it would be going altogether too far to say that such is necessarily adulterated.

To meet the requirements of those who call for a genuine fluid honey, we have been endeavouring to ascertain the conditions under which honey may be kept without candying. The factors we investigated chiefly were light. temperature, agitation, and what I might term "crystallizing points." The bottles of honey presented to-night were all taken from the same quantity or sample of honey while still fluid.

Light and Temperature. Two bottles were filled with honey and their temperature gradually raised to 122° F. One was placed in the window, where it was in full sunlight for several hours daily, the other was put in a dark cupboard. This experiment was started in September, practically three months ago. You will notice that both are perfectly fluid, showing no sign of granulation. That which has been kept in the light, however, is slightly bleached or lighter in colour.

Similarly, two bottles of honey were gradually raised to a temperature of 158° F. And one exposed in the window, the other kept in the dark cupboard. They are both fluid, but the honey that has been in the light is somewhat bleached.

On tasting the honeys, I thought there was a slight falling off in flavour in that exposed to the light. I also considered that the honey heated to 158° F., not quite so rich in flavour and aroma as that merely raised to 122° F.

The peculiar and characteristic flavour, or rather flavours, of honey undoubtedly comes from the presence of minute quantities, practically traces, of certain volatile oils present in the nectar gathered by the bees, and I am of the opinion that this may be lost in part if the honey is subjected to high temperatures and light.

If, therefore, it is wished to retain this characteristic flavour and keep the honey fluid, my advice would be not to raise the temperature higher than 122° F., and to subsequently keep it excluded from light.

It is possible, may probable, that all these honeys may granulate in time, but our experiment shows how it may be preserved without any sign of granulation for at least a period of three months, and that without deterioration in quality.

The honey from which these samples were taken began to solidify in about 10 days after we commenced this experiment.

Cold Storage. Two bottles of the fluid honey were put in our cold storage, which has a temperature of about 40° F. The honey granulated just as quickly as that kept at ordinary temperatures.

Q. Do you think light has any effect on granulation?

A. No, apparently not, but it bleaches the honey and seems to cause a slight falling off in flavour.

Q. How long is it necessary to keep the honey at 122° F.?

A. We kept these samples at that temperature for 15 minutes. If the honey has already granulated, it will be necessary to employ a somewhat higher temperature, as it will not become perfectly fluid at 122° F. But on no account should the temperature exceed 160° F.

Agitation. Honey was put in bottles and these placed in revolving machine kept constantly in motion. This honey began to solidify in the course of 10 days, the same period required by honey not so agitated. I, therefore, conclude that agitation neither favours nor retards granulation.

Crystallizing Points. Into a bottle of fluid honey a number of glass tubes were put. This honey granulated in about 10 days, showing that these "crystallizing points" exerted no influence, no appreciable influence, on the candying of the honey.

The Bleaching of Wax.

This Association requested me to ascertain, if possible, some ready, simple and cheap means of bleaching wax. For this purpose we took some very dirty, dark, crude wax, a sample of which I now show you.

On looking up the literature on the subject I found a very large number of receipts, most of which I have tried and found wanting. In all we have experimented with more than thirty methods, treating the wax in different ways with various chemicals. I shall not relate the results in detail, as for the most part they have proved failures. We have tried sulphuric acid in strengths from 5 to 30 per cent. Nitric acid also in varying strengths, chlorine, peroxide of hydrogen, bichromate of potash, and many other chemicals have been tested. We have also used animal charcoal as a filtering medium. Samples from all these methods are now exhibited and the nicest looking wax of them all is that from the treatment with hot one per cent. nitric acid. You will notice that sulphuric acid tends rather to blacken the wax than to bleach it; the stronger the sulphuric acid the darker becomes the wax. Five per cent. sulphuric acid used hot does not injure the wax, but stronger solutions cannot be employed without decomposing a part of the wax. Thirty per cent. sulphuric acid acts very quickly in blackening the wax, at the temperature of boiling water.

Q. How did you treat the waxes with acids?

A. Metal vessels cannot be used for this purpose, glassware or crockery must be employed. Our method was to pour some of the acid solution we were experimenting with, as for instance, the one per cent. nitric acid, into a glass beaker and heat over the gas flame till the dilute acid began to boil, a piece of crude wax was then dropped in, and when it had melted it was stirred into the acid by means of a glass rod, the acid being kept at about boiling temperature for 10 or 15 minutes. The whole was then allowed to cool and cake of solidified wax removed from the surface of the liquid. Sometimes the operation was repeated with a fresh supply of acid. Of all the chemical methods tried we think the one per cent. nitric acid solution gave the best looking wax.

Another method, and one more satisfactory than any of the others under examination, consisted simply in purifying the wax by repeated meltings in hot water and then exposing the wax, in thin cakes or shavings, to the direct sunlight. I present to you two samples of wax, both are from the same wax and clarified by being melted and stirred in successive portions of hot water. The darker way was put in a bottle on a shelf in the laboratory; the lighter was spread in a thin layer and exposed to the sunlight and atmosphere for a fortnight. This exposure, you will notice, has very materially bleached the wax. This is practically the method adopted by those most successful in wax bleaching.

Q. Does the treatment with water remove impurities?

A. Yes; a great deal of the foreign matter, coloring matter, sugar and dirt of various kinds are thus got rid of.

Q. Does it injure the texture of the wax to bleach it?

A. I do not think so; but on this point I should not like to speak too definitely.

Q. What do you mean by one per cent. of acid?

A. One part by weight or volume of the acid to 99 parts of water. Five per cent. of acid is 5 parts of the strong acid to 95 parts of water. My suggestion, therefore, would be to wash with successive portions of hot water and bleach the resultant wax by exposure in the atmosphere and sunlight.

Q. Can wax be injured simply by melting in hot water?

A. If subsequently cooled quickly the texture is somewhat altered, and the ductility somewhat impaired—a granular wax, in fact, in formed. By remelting it slowly cooling I think in a great measure the ductility could be restored.

The Nature of Skimmings.

Among other matters, I was asked to ascertain the nature of the "skimings" from the larger cans of honey. As is well known, a scum forms on the strained honey on standing. This is removed by skimming, hence the name "skimmings." We obtained from our own apiary at Ottawa a quantity of this material, and analysis showed it to consist chiefly of wax.

Mr. Holtermann: My opinion is that in many cases the froth is caused by entanglement of air as the honey passes through the atmosphere. This froth is not wax. But I am ready to admit that there may be wax in it if improperly strained.

A. The scum consists chiefly of small particles of wax, which being lighter than the honey slowly rises to the surface.

Honey Dew.

Some months ago I received from a correspondent in Charlottetown, P. E. I., a small twig of spruce, the needles of which were covered with what looked like candied sugar. The question arose what was the origin of this material. Was this "honey dew" exuded as a saccharine fluid from the spruce, or did it arise from the secretion of aphides (plant lice)? There are certain conditions of the atmosphere when trees may exude large quantities of sugary fluid from their leaves; indeed, not infrequently this "honey dew" has been known to drop like rain upon the ground beneath the trees. Then again, as is well known, the aphides suck large quantities of the sap and exude it again, and this is known as "honey dew." Being of a sweetish nature, this honey dew attracts the ants.

Upon analysis of the candied material on the spruce needles we found it to contain 59 per cent. of cane sugar and 16 per cent. of glucose. My opinion is that this is an exudation from the tree. Certain trees, oaks, especially, give rise to the secretion when the air is loaded with moisture and there is no free transpiration from the leaves. I have never heard, however, of honey dew forming on the conifers or evergreens. If this honey dew we examined had been secreted by aphides I think the proportion of cane sugar would have been less and that of the glucose greater. This, however, is only an opinion. If during the coming year you are able to secure any specimens of honey dew I shall be glad if you will send them to me. I also request that you should make special note as to the presence or absence of aphides.

Q. Do you think honey dew is a secretion or the excrement of the aphides?

A. It is, I think, more of the nature of a secretion.

Mr. Darling: This year, when up at the exhibition, I noticed in passing along the street that the Norway Maple trees were alive with bees. If I thought you would have been interested in the fact I would have notified you. I think the leaves were covered with honey dew.

Mr. Holtermann: I should like to make a suggestion. Would not honey solidify more quickly if it were kept stirred as it begins to granulate?

A. We have in a sense tried that experiment. We kept samples in agitation, as I have told you, until thoroughly granulated. It did not appear that agitation hastened the granulation.

Mr. Hall: We found that honey brought down to the exhibition granulated sooner than that left at home. Within ten days it began to granulate; the honey that had not been moved was then still perfectly fluid.

A. That would appear to indicate that the jolting had caused or hastened the granulation. Our experiment did not give any data supporting that view: but that does not conclusively show that agitation has no effect on granulation.

The honeys that I have brought here to-night to illustrate these experiments may be tested by you at the close of the meeting.

PRODUCTION OF COMB HONEY.

By R. Lowey, Cherry Valley.

In the production of comb honey colonies must be strong in *bees and brood* at the beginning of clover bloom. As soon as the first blossoms appear put on one super of clean or new sections *filled* with *thin super* foundation, and with separators. As soon as this is about half filled, if well covered with bees, put another super under the first; when these are about filled, and prospects are still good for some days, put a third super on top of these. When well started in this last super, the first two will likely be ready to take off, after which, if prospects are good for a continued flow, put another under; if likely to close before both are finished, and bees need room, put it on top. Should there still be prospects of continued flow from clover or basswood, continue as before—put a third on top. I do not think it advisable to put more than three supers on at any one time.

Thus far it is assumed that bees have not swarmed. Where they swarm—and usually 50 to 75 per cent. will do so (in producing comb honey)—hive them, two, and sometimes more, swarms together on four drawn combs or full sheets of foundation (fill up the balance of hives with dummies) on the old stand, first putting supers from the old hive on the new, with a queen-excluder under. Turn the old hive around and set it a little way back. In the evening turn it around and set it along side the swarm, on the right hand side. If increase is desired, move to a new stand the 6th day, and they will seldom swarm again during the season. In about three weeks examine them to see if they have a laying queen; if so, and quite strong in bees, and prospects are good for a fall flow, give them an extracting super with four or five combs (fill up the super with dummies) and they will, if the season is good, give quite a little surplus. Give the queen room below for brood.

Where increase is not desired, in about two weeks after the swarms are hived, fill up the hives with bees and brood from colonies that have swarmed within seven days, first cutting out all queen-cells. If there are still more colonies than you want, double up by shaking off all the bees from any number of colonies into one, with a young laying queen, until they are *strong* in bees. You can then give them a super of sections or extracting combs, as you wish. Place the remaining combs of brood and honey in extracting supers over the colonies weakest in bees you have in the yard; the young bees hatching will strengthen them, and any honey stored in them, or already in, will come good for feeding in fall or spring.

As soon as all, or nearly all the sections in each super are capped they should be removed from the hive, by raising up and putting a board with a bee-escape under for a few hours—not more than about twelve hours—when most of the bees will have gone out. The supers should then be carried into a room with one window, to which any remaining bees will fly, when the window may be opened and the bees will return to their homes. Any bits of comb on the bottom of the supers should be scraped off.

Now as to the care of comb honey: The supers should be piled up as high as convenient, say about fifteen high, outside on the ground, with an empty super under. Place in a dish on top a few tablespoonfuls of bisulphide of carbon. Cover up tight for about twelve hours and it will be safe from any damage from the wax-moth.

The honey should then be carried into a *warm*, *dry* room, and piled so the air can circulate through it for two or three weeks, or until you are ready to clean it up and pack for market.

Mr. Pettit: I have been very pleased with Mr. Lowey's paper. He has given us quite a full description of the method of taking comb honey in almost every respect, and it tallies with the method which is commonly used. Mr. Lowey mentions using dummies in taking extracted honey. I can not see any use in that, because I like to get as much room in the brood chambers as possible. Then, in putting on sections, we find in many cases where they are very strong it becomes necessary to put on two supers. Mr. Lowey only puts on one. That is a point that is important, because there are many colonies that are so strong that if we put only one they will not go up at first.

Mr. Lowey: I sometimes put on two myself. I spoke of the dummies with reference to colonies that have swarmed and are weak, but perhaps if they get up above a little, I have had to scatter a little bit of honey in one section and some in another.

Mr. PETTIT: In the matter of putting on the third super he puts it on the top. That is all right where it is near the end of the flow. Of course you want to get the third super on before the others are entirely finished, and of course the work is stopped in the other ones until the last one is in that stage, and the point is to put that on to give them room to work. There is one point on which I would like to differ very strongly. That is for hiving swarms for comb honey on drawn combs. I have tried this, and in every case in a short time we found the queen cells ready for swarming. I think it was Mr. Sibbald who mentioned in one of our conventions that we have for hiving swarms this order of preference: starters, full sheets of oundation, and drawn combs as a last resort. In taking extracted honey it is a different matter. Then with regard to putting two or more swarms together. That is a good point if your swarms are not very strong, and one of the main difficulties in taking comb honey is that we get swarms before they are as strong as they should be. I do not know that there is very much more for me to mention, except that in my experience of taking comb honey and extracted honey every year I am more and more in favor of extracted honey, for the reason that it is impossible to hold your stocks together in taking comb honey. As a rule they swarm before there is much work done in the sections, and this breaks them up, and in out-yards it is a very difficult matter to control them and get any kind of results.

Mr. LOWEY: I have tried starters, and I have tried foundation for several years, and this year I tried combs, and I find in every case they catch pollen. I have had several spoiled with pollen. So far as swarming is concerned, I do not clip the queens; I just shake them down. I have a broad pan—a dish pan—with about a four-inch rim around the top, that would hold about three pecks, and I shake that full. I think some of those bees go back to where they come from.

Mr. HALL: Is that a short flow?

Mr. LOWEY: We had bloom six weeks this year; plenty of bloom.

Mr. PETTIT: Of course as to the pollen in the sections, it is very easy to make that all right. We had a comb and a queen excluder. That is as important as the comb.

Mr. LOWEY: We use queen excluders, but we find them useless. The pollen goes through just as quick with them as without them.

Mr. PETTIT: In every case you find the queen cells in three weeks, when swarms hived on combs.

Mr. ARMSTRONG: Is it necessary to fumigate the comb honey?

Mr. HALL: Sometimes very necessary.

Mr. ARMSTRONG: Is it necessary to fumigate it as soon as you take it off? I find if it has never been exposed you never need to fumigate.

Mr. SIBBALD: I have never had any experience.

Mr. HALL: You have not had much pollen in it.

Mr. LOWEY: I have had where there was no pollen there were those little flowery spots, and I would not like honey to go out with that on. If you wait too long the damage will be done. If you would take your honey right out of the supers you would know if there was any pollen around. Some I did not fumigate because I did not see any moths.

Mr. HUTCHINSON: I made an experiment along the same lines as Mr. Lowey spoke of in his paper. I hived one on drawn comb, and I contracted the brood to about six frames. I hived another on comb foundation, and I hived another on starters, and I went over them again alternately until I had six or seven swarms each way, and the prospects were so poor with those that were hived on the drawn combs that I quit it. They filled them up so quickly, and after they got it done they seemed to think that they had the job completed, while the ones that were working on the comb foundation were piling the honey up. Then I kept on till about the end of the season, and hived about fifteen on starters and full sheets of foundation. There was not very much difference between those, but what difference there was, was in favor of the starters. When you hive a swarm that way and contract the brood nest they have got to build comb. There is a lot of honey coming in, and they go right up and start it, and you will have a brood nest that is a brood nest, and supers that are full of comb honey. I tried that for several years, and I satisfied myself that it was better to have starters. On the subject of pollen, when I put the supers over from the old colony to the swarm, and those combs had honey in them, they did not put any pollen in them; but when they were empty combs then they put the pollen up there. That is how it worked out with me. As to the moth trouble, I never had to fumigate any comb honey or never saw a moth. Without the pollen, there is no trouble with the moths.

Mr. **Pettit**: I have had experience with producing and handling comb honey for fifteen years, and have handled a good many sections, and have never fumigated a section and have never had any complaints from the buyers that there were moths. I would like to ask Mr. Hutchinson if he found any difference between those hived on foundations and starters in the fall?

Mr. **Hutchinson**: I weighed the combs and the colonies and I cannot give the reason, but the ones that had the starters weighed the most.

Mr. **Holtermann**: And the least number of bees?

Mr. **Hutchinson**: I don't know about that.

The **President**: You will understand that Mr. Hutchinson was after comb honey, not after increase.

Mr. **Hall**: But we cannot get it in the shape to market it, and Mr. Hutchison does. ...

Mr. **Anguish**: It is money we are after, and I think we can get as much honey out of comb honey as extracted. My practice is the same as Mr. Hutchinson's,—hiving on starters and working for comb honey. I raise comb honey. At one time I quit the comb honey, but I have gone at it again. I have no trouble with the moths. If you keep out the pollen you will have no moths.

Mr **Smith**: In Mr. Hutchinson's experiments, does he try to get a brood nest that would have to be melted up in the fall? My experience is that we have to replace those combs if we want combs fit for the next season.

Mr. **Hutchinson**: We get some drone comb. My theory of the matter is that so long as the queen can follow the comb builders or keep up with them, they build worker comb, but if the brood nest is too large, or if the queen is so old that she doesn't lay fast enough, the work is getting ahead of her, and they build drone comb; but a young queen and a good swarm hived on a Langstroth frame gives as nice combs as you will get anywhere.

Mr. **Smith**: I think we have a larger amount of drone comb when the flow is lighter.

Mr. **Sibbald**: My idea is if we get cool days the bees go down below and get out of the supers altogether and build drone combs, and when we get regular warm days we get them up in the sections.

QUESTION DRAWER.

Q. What is the best fuel to use in a smoker?

Mr Brown: Rotten wood; preferably black ash.

Mr. Lowey: I use pine bark thoroughly dried, that is second growth. It will burn for hours if you are careful with it.

Q. What is the best sized frame for comb honey production?

Mr. Brown: I would say the ordinary Langstroth frame for the production of comb honey. That is my experience. If the question had been extracted honey, I probably would have given a different answer.

Q. Instead of uniting two weak colonies in the fall—colonies that were made weak by working—would it not have been better to have united the two swarms when hiving them, and have them in a full sized hive?

Mr. Brown: It would have been better to have united them in swarming time than to have united them in the fall.

Mr. Pettit: I do not think that exactly answers the question. My experience in hiving swarms on starters for comb honey is that in the fall they are about a certain strength, no matter whether they are strong when they were hived or not, because it is three weeks before there is much brood, and the old bees die down to a certain strength anyway.

A Member: The reason I asked that question was, a man said to me, "Why not unite them, and give them a full sized brood nest instead of hiving them separately?" That is one point. Why not have them in a full sized hive instead of a contracted brood nest?

Mr. Lowey: In about ten or twelve days I should give them more comb. If you leave them until they are full they will be very weak in bees. The queen will be ten days, or probably two weeks, occupying those combs.

Q. What is the best method of preventing after swarming?

Mr. Brown: Give sufficient room at the proper time. Have sufficient room for your bees until the honey flow is about taking place (with me until the white clover is about a week in bloom or perhaps five days); then add on sufficient room, put on your supers according to the requirements of the bees and very little swarming will follow. But I see it is for after swarming. That is rather a different question. My method would be to remove the old colony and set a new one in its place. I remove the old colony to where I intend it to remain. If you wait a week or so until the young queens are hatched, it is so debilitated just at that time that they do not usually swarm.

Mr. Pettit: It is just as well to give an extracting super to the parent stock as soon as it swarms.

AMENDMENTS TO THE FOUL BROOD ACT.

By F. J. Miller, London.

The subject "Amendments to the Foul Brood Act" is one that has received considerable discussion at different times, and, generally speaking, I believe the meaning of the Act not to be far astray. As to one Inspector being able to carry out the work to the best satisfaction of this Association. I am not so certain. It appears to me there should be three good men under the direction of this Association, each responsible for a given district, from which he would not be too far distant, so that the travelling expenses might be reduced as much as possible. This also would enable more work to be done during the short period of our honey flow. These are matters in which we are all interested, although some may have somewhat different views on the subject.

Some have advocated county inspection. This I believe to be jumping to the extreme, and not to be in the best interests of bee-keepers. In fact, I believe it is impracticable. There are but few counties having well organized associations that could carry on the work; others would suffer. Again, this Association would find it very difficult, I may say impossible, to control the work through so many inspectors. The funds at our disposal would not warrant opening the way for so many leakages as would occur. Therefore, I am of the opinion that three inspectors, each responsible direct to this Association for the work to be accomplished, would give better results, than either the present system, or the one of county inspection, and it would bring greater harmony into the work of the Association.

Prof. HARRISON: I think Mr. Miller has put the matter before you very well. He has shown you the two extremes. On the one hand the present system of one inspector, and on the other, the extreme of local inspection in even its extremest form of county inspection. This latter extreme is, I think, not timely. Many counties have no local association, and further than that the counties have not the means for carrying on this work. Neither is it probable that the Government would provide funds for county inspection. In going before the Government (in this case the Department of Agriculture, with which the Association is more immediately concerned), one has to present a case showing how much work has been done by the Association, and the benefit that work is likely to give to the people, particularly to those engaged in bee-keeping; and, if their case is good, then probably the Department of Agriculture would increase the grant, such as is being done with many of the other Associations, such as the Dairymen's and the Fruit Growers' Associations, and the Experimental Union of the Agricultural College. There the grant has been increased from $500 to $2,500, because they have shown the Government that the work they are doing is valuable to the community. There is an impression abroad that this Association is not doing all it could do for the Province, and hence we have to go rather slowly if we want to introduce any reforms in the Foul Brood Act until you can show good cause for asking for an increased grant. The scheme proposed, and which has been discussed by the Directors and also by a Committee, is probably the best, and that probably can be improved on at a later date. Personally, my view is where there is a well organized local society which can obtain funds from the County Council and funds from themselves, that such an organization could afford to contribute a proportion—half, perhaps—to the fund of inspection; and the Association would then probably give the other half. Then inspection could be carried on thoroughly in that district, and probably that would be something which would work. The present idea is to have three inspectoral districts, and an inspector who is responsible for each district, and by so doing we shall begin a reduction in the expenses, because each inspector will not have so far to travel in his district. Again, the work of inspection will probably be done at a more seasonable time than it is done under the present dispensation, and also the funds of the Association by this means need not necessarily be increased for a year or two. So that I think this system of three inspectors is an excellent one for the time. I do not think it is the best under all circumstances, but I think it is a step in the right direction. I am in favor of the proposition that has been introduced.

Mr. Hall: I think Mr. Miller's ideas are very good as far as they go. I think I can say from my personal knowledge that it is very difficult to keep clear of foul brood, and it is more difficult to dispose of it after we have got it. If we go from one inspector to three or four I am of the opinion that the expenses will be larger than they are now. The thing is now, to get the man who knows it. This year I thought I had it in my yard, but your inspector happened to come along and he said, "I would like to see it." Then he said. "There is no foul brood here." "Well," I said, "twice I have had it, and this is it." But he said, "This is not foul brood," and he said, "Where are the others?" He looked at the second lot, and he took up a pin, and stuck it into it, and said it wasn't foul brood. I had condemned my own bees because I didn't know enough about it. Of course if you can get intelligent men to do it, all right; but you will have to get them in June or July, when their time is worth $25 or $30 a day; and who is the man that is going to sacrifice his time like that for the sake of his brethren? That is the only objection I have to increasing the number of inspectors.

Mr. Dickinson: There is one thing that strikes me, and that is if you appointed three inspectors, and they have apiaries to look after at home, I think they would rather be with their own apiaries at home, where there was more money in sight. Of course I think you can get men in the Association who might devote their time, and possibly might be able to do something in the nature of inspecting; but I think they would have to have more money than I understand there is to give them at the present time, especially if those gentlemen appointed should have apiaries of their own. I think a man's time with his own apiary is worth a great deal of money just at the time that he would have to be inspecting.

Mr. Evans: The present inspector has an apiary, and the same argument would apply. I am not an applicant or a candidate for the position of inspector, either for the county or anything else. I have too much to do. I think the object of this Association ought to be to inspect every hive in the Province if possible, and under the present system it is impossible to do that. It takes too much time. I was looking over the reports since 1893, with the exception of the report of 1904, and it is astonishing the amount of foul brood there is. I may say there does not appear to be much improvement in this respect. We have ten thousand apiaries in this Province, and it would take about one hundred years to get over all those apiaries unless some better method is adopted, so that we can get over them a little faster. I would go even farther than was suggested and appoint a number of inspectors and let the Provincial Inspector look after the uncovered districts. We all know that the travelling expenses are very heavy, and take a lot of money. I remember when I was President of this Association we got a request from Ottawa to go there, and you know the cost of going to Ottawa. Now, there are plenty of good bee-keepers in Ottawa who could do this work, and I think you can get inspectors in every county of this Province who could do the work. Instead of increasing the expenses, I think it would decrease them because the travelling expenses would be cut in two. Let the Provincial grant be divided between that part which still sticks to one inspector and the part that has the local inspectors. Then I think the bee-keepers could get grants from the County Councils, and the influence of this Society should be used in that way. If this system of inspection could be arranged, then the local men would not have to travel a couple of hundred miles perhaps to see whether a yard was satisfactorily cured or not. I have a motion on these lines which I thought would be more satisfactory. It is as follows: "That this Association petition the Legislature of Ontario to so amend Cap. 283, R.S.O., 1897, that each County or District Bee-keepers' Association that is affiliated with the Provincial Association shall have the power to appoint an Inspector of Apiaries with all the powers now conferred on the Provincial Inspector; and also providing that when such County or District Inspector is appointed, the jurisdiction of the Provincial Inspector shall cease in such locality: and further providing for the division of the Provincial grant so that the Local Association shall receive a share on such terms as the Legislature shall determine. County or District Associations to have the power to fix the Inspector's salary and determine his duties." If we could get more inspectors appointed, we could probably do away with foul brood.

Mr. Holtermann: To whom is that man to be responsible?

Mr. Evans: To that county, and that alone.

Mr Hall: By whom are they to be appointed? By the Ontario Society or by the Government?

Mr. Evans: I am suggesting that each Society appoint its own.

The President: The question is, whether there should be three or two inspectors. The discussion should be on the point of whether it is better to have three or two.

Mr. Evans: I may say that while the discussion may be confined to one line it is quite in order for a member to make a motion, and I would move the resolution I have just read.

PROPOSED AMENDMENTS TO THE FOUL BROOD ACT.

Prof. F. C. Harrison then read the proposed amendments to the Foul Brood Act on behalf of the committee appointed to deal with that matter. The Act, as finally amended for adoption by the Legislature, is given at the close of the discussion:

Mr. McEvoy: I think the Convention can accept that bill as now amended, with the exception of one change. It is simply perfect, and your committee should get credit for it. That clause is as to making the inspector the sole judge. That was up before the Parliament for four weeks in 1890. We claimed that that was right, because if a man was so disposed he could go and bring in bees right at the season of the year when they would rob, and set them right down at the side of me if there was no Act. I think we could pass the whole of it except that clause.

It was moved by Mr. Hall, seconded by Mr. McEvoy, that the amendments be taken up clause by clause. Carried.

It was moved by Mr. Deadman, and seconded by Mr. McEvoy, that only the clauses which are objected to be discussed, and after they are settled that the report be then passed as a whole. Carried.

Mr. Evans: I have no doubt the directors have spent a great deal of work on this report, and I will withdraw my motion.

Mr. Couse: I feel that I ought to say something on the clause. I think that clause does not go far enough. I have had the impression that if that were changed it could be easily arranged that a local association be appointed in each district, in the twelve or thirteen districts, and let those local men recommend the inspector for their district, and let the appointment be either through the Association or the Government. I have the impression that three inspectors can not do the work at the right time; in fact I know they cannot. I am satisfied that a man will go and inspect an apiary at say twelve miles from where he resides if he goes in the fruit bloom at a dollar an apiary. If he leaves it till later it will cost more. He can go in May usually, and if a man is interested in his own bee yard he will almost go for nothing, and I will guarantee it will not cost two dollars an apiary to inspect the bees within ten miles. And that man if he was an inspector would soon have all his neighbors educated as to what foul brood is. I feel that twelve inspectors would do far more work and cost less money. I think we should aim at having a local association for a district, and I do not see any reason why it could not be arranged. It would be much better than county associations. Then you would have a director in each district, and you would have it right under the eye of the directorate. Perhaps some of you would not go so far as that, but that is my feeling. It is not hard to inspect an apiary in May, but if you wait till July, August, or September, or after the honey flow is over. you are only going to spread it.

A MEMBER: It would be better to have three qualified men rather than have more who are not qualified.

The PRESIDENT: There are, of course, extreme views on both sides; but couldn't we compromise on something so that we would be unanimous, and then we would make some progress.

Mr. HALL: I am convinced from my personal experience that a local inspector would be under a great disadvantage. They will say he just wants to shove us litle fellows out, and they won't complain to him, but will keep the disease. In my own locality you can not inspect them for a dollar an apiary, with all due respect to the secretary. A man who inspects must have some knowledge and experience, and if he is a bee-keeper he can not spare that time, especially at the small remuneration that has been mentioned. I do not know of any man in our Association who would do it for that.

Mr. CRAIG: Can three men cover the Province? Would the districts not be too large for them to give the attention to it that it demands?

Mr. MILLER: We are now trying to amend the Act to improve our conditions, and it was considered that three were much preferable. I understand it does not seal the road to further improvement, and any time the Association deems it necessary to have more than three the Act can be amended.

Mr. DARLING: We tried to get between the two extremes, and I think we did right when we narrowed it down to three. If we went to the Government just at the present time and wanted money for seven or eight we would not get it. If we ask for three, then in the course of a year or two we may be able to get a larger grant.

It was moved by Mr. DARLING, and seconded by Mr. LAING, that the clause be adopted as read, changing to three inspectors. Carried.

Prof. HARRISON read section 2.

Moved by Mr. DARLING, and seconded by Mr. SPARLING, that the clause be adopted as read. Carried.

Prof. HARRISON read section 3. The change in this is that this sentence is struck out: "After inspecting, the inspector shall, etc." and also this sentence: "He shall be the sole judge, etc."

It was moved by Mr. EVANS, seconded by Mr. SPARLING, that section 3 be adopted as read.

Mr. McEvoy: I object to that clause, and I do not think Parliament will pass it. Now, if you men had two or three hundred hives, and I could go down in any section of the country and set down my affected bees that would rob, and you had to send to the college for a man, that large apiary would be ruined in the meantime. Make the inspector the sole judge. Who would dispute him? Only the crooks. This question was four weeks in Parliament, and Sir Oliver Mowat called the Cabinet on it, and gave the inspector the sole judgment. We then held that it was necessary, that it was a dangerous thing if you took away the power from him, because the crooks could appeal, and they could keep it going until you would not have a bee left. Leave it in the inspector's hands, and if he goes too far put another in the next year. But do not put it in such a position that a crook can come along and clean a man out of bees. I do not think the Legislature will pass it with that dangerous clause in it.

Mr. Miller: I think Mr. McEvoy is right there.

Mr. Brown: I am satisfied that Mr. McEvoy is right. He says if a man with a few colonies comes along and sets them down beside a man with large colonies, if he is inclined to do so he can carry that to the extreme, and he can make his appeal to the bacteriologist, and the man with the large apiary is swamped in the meantime.

Mr. Evans: The old Act does not apply to burning of colonies, but gives him the power to prevent the burning. (Reads Act.) It is not a question of giving him power to destroy them, but giving him power to save them.

Mr. McEvoy: If there is any appeal, and you have got a large bee yard, you are at the mercy of the man while this appeal is going on and the bees are robbing. Make the inspector the sole judge, and do not leave the man with the big yard to the mercy of the crooks.

Mr. Byer: I think in ninety-nine cases out of a hundred there need be no mistake made by those appointed. Any man we appoint should understand foul brood. I think it is well known by the majority of bee-keepers.

The President: There is another side to consider besides the inspector. He might make a mistake. He is not infallible, and this is just in case of dispute. An inspector comes to an apiary and he says you have foul brood, and the man in ninety-nine cases out of a hundred is satisfied with the decision of the inspector, and he does not need to send to any place to have it pronounced upon.

Mr. Evans: The question of appeal comes in in another clause, and it may be a very important matter, but in the present section it does not matter a button whether it is left in or not. (Reads section.) It is simply a clause giving the inspector power to allow the hives to be cured without burning.

Mr. Hall: I would object to waiting to see whether the hives are cured. Before that the neighboring colonies would be destroyed. A man may say: "I do not believe it is foul brood until you send it to the scientist to prove it;" and while we are waiting for the doctor the child dies. If the inspector is an intelligent man and understands his business, it seems to me we are wasting time going to the bacteriologist about it.

Prof. Harrison: There is no question at all about the inspector being the judge when it is necessary to burn. The line is drawn already in the Act. It says, "When the inspector is satisfied." There is no appeal from that at all. Then the other comes in: "But where the inspector, who shall be the sole judge thereof, etc." That is, in its incipient stages. That is the proposed clause. There is no question about the inspector being the sole judge when it is a malignant type, but in its incipient stages it is difficult to say.

Mr. Hall thought he had foul brood until it was proved to the contrary. Then a portion of the foul brood can be cut out and sent to Guelph. I am no longer a member of the College, and I will not get anything out of it, and the man at Guelph will not get anything out of it, and the Association will have the benefit of the result. There is no question of it taking months or weeks to get an answer. It is a question of hours only. It can be made in forty-eight hours. There is no reason why a telegraphic report could not be sent if necessary. It is just along the same line as the doctors with the diphtheria, and on the evidence of the bacteriologist he gives his decision. And there is always some one at Guelph to do this work. I think some of you will agree with me when I say it is a very difficult matter to detect foul brood in its first stages. I have seen a great deal of it in Europe, and when it begins I think it is a difficult matter to decide; but the bacteriologist could tell you in five minutes whether foul brood is there or not.

It was moved by Mr. McEvoy, and seconded by Mr. Hall, that the words "who shall be the sole judge thereof," be restored, and the balance of the clause adopted as read. Carried.

It was moved by Mr. Evans, seconded by Mr. Brown, that sections 4, 5, 6, 7, 8, 9, 10 be adopted as read. Carried.

Prof. Harrison reads section 11 as amended, which on motion of Mr. Hall, seconded by Mr. Darling, was declared carried.

Prof. Harrison read section 12 as amended.

Mr. Darling: I would move the adoption of that section, but I would suggest the words "also a statement" be put in.

Mr. Sparling: I second that. Carried.

Mr. Evans: I would point out that you are compelling this Association to make reports, but nowhere do I see where the inspector is called upon to make a report to anybody. It does not seem to make it clear that the inspector is bound to report to anybody.

Section 13 as amended was read, and on motion of Mr. Evans, seconded by Mr. Brown, was declared carried.

Mr. Darling: I move, seconded by Mr. Shaver, that these amendments be forwarded to the Minister of Agriculture, with the request that they be passed by the Legislature at the next session, to take effect at our next annual meeting. Carried.

An Act for the Suppression of Foul Brood Among Bees.

R. S. O., 1897, Chap. 283.

1.—(1) The Ontario Bee-keepers' Association shall at each annual meeting, or the directors of the said Association shall, if in the interval between two annual meetings the occasion arises, appoint three inspectors of Apiaries for the Province of Ontario, and the said inspector shall be elected by the vote of the majority of the members of said Association present at the annual meeting, or the vote of the majority of the directors as the case may be. Any annual meeting may delegate the annual appointment of an inspector to the newly elected Board of Directors.

(2) The inspector on entering upon any premises in the discharge of his duties shall, if so required, produce the certificate of the President of the said Association that he has been appointed as such inspector, or sub-inspector, as the case may be. 53 V., c. 66, s. 1.

Section 1.—(3) The Province of Ontario shall be divided into three districts for the purpose of this Act, and one inspector shall be appointed from each district.

2. The said inspectors shall hold office for one year from the date of the annual meeting at which they were appointed, or if they are appointed by the directors, then until the next annual meeting after such appointment and shall be eligible for re-election, but an inspector may at any time, subject to the approval of the Lieutenant-Governor in Council, be removed from office by the directors for neglect of duty or other sufficient cause, and in case of such removal the directors shall without delay appoint a successor. 53 V., c. 66, s. 2.

3. The said inspectors shall, whenever so directed by the president of the Ontario Bee-keepers' Association, visit without unnecessary delay any locality in the Province of Ontario and there examine any apiary or apiaries to which the said President may direct him, and ascertain whether or not the disease known as "foul brood" exists in such apiary or apiaries, and, wherever the said inspector is satisfied of the existence of foul brood in its virulent or malignant type, it shall be the duty of the inspector to order all colonies so affected, together with the hives occupied by them, and the contents of such hives, and all tainted appurtenances that cannot be disinfected, to be immediately destroyed by fire under the personal direction and superintendence of the said inspector, but where the inspector, who shall be the sole judge thereof, is satisfied that the disease exists, but only in milder types and in its incipient stages, and is being or may be treated successfully, and the inspector has reason to believe that it may be entirely cured, then the inspector may, in his discretion, omit to destroy or order the destruction of the colonies and hives in which the disease exists. 53 V., c. 66, s. 3.

4. Any inspector shall have full power, in his discretion, to order any owner or possessor of fees dwelling in box-hives, in apiaries where the disease exists (being mere boxes without frames), to transfer such bees to movable frame hives within a specified time, and in default of such transfer, the inspector may destroy, or order the destruction of, such box hives and the bees dwelling therein. 53 V., c. 66, s. 4.

5. Any owner or possessor of diseased colonies of bees, or of any infected appliances for bee-keeping, who knowingly sells or barters or gives away such diseased colonies or infected appliances, shall, on conviction thereof, before any Justice of Peace, be liable to a fine of not less than $50 or more than $100, or to imprisonment for any term not exceeding two months. 53 V., c. 66, s. 5.

6. Any person whose bees have been destroyed or treated for foul brood, who sells or offers for sale any bees, hives or appurtenances of any kind, after such destruction or treatment, and before being authorized by the inspector so to do, or who exposes in his bee-yard, or elsewhere, any infected comb, honey, or other infected thing, or conceals the fact that said disease exists among his bees, shall, on conviction before a Justice of the Peace, be liable to a fine of not less than $20 and not more than $50, or to imprisonment for a term not exceeding two months, and not less than one month. 53 V., c. 66, s. 6.

7. Any owner or possessor of bees who refuses to allow an inspector or his assistant to freely examine said bees, or the premises in which they are kept, or who refuses to destroy the infected bees and appurtenances, or to permit them to be destroyed when so directed by an inspector, may, on the complaint of the inspector, be summoned before a Justice of the Peace, and, on conviction, shall be liable to a fine of not less than $25 and not more than $50 for the first offence, and not less than $50 and not more than $100 for the second and any subsequent offence, and the said Justice of the Peace shall make an order directing the said owner and possessor forthwith to carry out the directions of the inspector. 53 V., c. 66, s. 7.

8. Where an owner or possessor of bees disobeys the directions of the said inspector, or offers resistance to, or obstructs the said inspector, a Justice of the Peace may upon the complaint of the said inspector, cause a sufficient number of special constables to be sworn in, and such special constables shall, under the directions of the inspector, proceed to the premises of such owner or possessor and assist the inspector to seize all the diseased colonies and infected appurtenances and burn them forthwith, and if necessary the said inspector or constables may arrest the said owner or possessor and bring him before a Justice of the Peace to be dealt with according to the provisions of the preceding section of this Act. 53 V., c. 66, s. 8.

9. Before proceeding against any person before a Justice of the Peace, the said Inspector shall read over to such person the provisions of this Act or shall cause a copy thereof to be delivered to such person. 53 V., c. 66, s. 9.

10. Every bee-keeper or other person who is aware of the existence of foul brood, either in his own apiary or elsewhere, shall immediately notify the President of the Ontario Bee-keepers' Association of the existence of such disease, and in default of so doing shall on summary conviction before a Justice of the Peace be liable to a fine of $5 and costs. 53 V., c. 66, s. 10.

11. Upon receiving the notice in the preceding section mentioned, or in any way becoming aware of the existence of foul brood in any locality, the said President shall immediately direct an inspector to proceed to and inspect the infected premises; but where or there is reason to believe that the information in said notice is untrustworthy, or that the person giving such notice is actuated by improper motives, then the President may require the person giving such notice to deposit the sum of $5 with the President as a guarantee of good faith, before the said notice is acted upon, and if it proves that said notice was properly given, then the said deposit shall be returned to the person giving such notice, but otherwise the said deposit shall be forfeited to the use of the said Ontario Bee-keepers' Association.

12. The said Association shall include in its annual report to the Minister of Agriculture a statement of the inspector's work during the preceding year, which statement shall include the weekly reports sent by the inspectors to the President of the Association, containing the following information:

Date of visit.
Owner's name and address.
Number of colonies in apiary.
Number of colonies diseased.
Number of colonies burnt.
Number of colonies recommended for treatment.

Also a statement of the amount paid to the inspectors for their services and expenses for the preceding year.

13. The directors of the said Association may from time to time make such by-laws and regulations for the control and guidance of the inspector in carrying out the provisions of this Act as they may deem necessary, and the said directors shall also by by-law fix the amount of the renumeration of the said inspectors, but all such by-laws and regulations shall be subject to the approval of the Minister of Agriculture. 53 V., c. 66, s. 13.

H. G. SIBBALD'S PLAN OF PREVENTING SWARMING.

By J. Fixter, Ottawa.

Your Secretary wrote me to make some tests of methods of preventing swarming—one as practised by Mr. Sibbald and the one used by Mr. Pettit. I was unable to exactly carry out the plan advised by Mr. Pettit, as my hives were not of the same size.

For this test six colonies of bees in eight-frame Langstroth hives were selected, weighing on an average 48½ pounds each. All were examined for swarming. June 10th there was no sign of swarming. At that date each colony had abundance of brood and a considerable amount of new honey. June 15th they were again examined. Three colonies were found preparing to swarm. Those three colonies were set off their old stands a little to one side. New hives were placed on the old stands thus left vacant. The new hives each contained two empty combs and five empty frames with two inch starters of foundation. The next operation: One frame of brood with queen-cells on it, is taken from the old colony that had been set to one side, making sure that we did not get the queen, and place it with the adhering bees, in the hive between the two empty combs. The extracting super that had previously been removed from the old colony, is placed with all the bees it contains on the new hive. On June the 19th a second examination was made. One more colony was preparing to swarm; this one was treated the same as the former. The old colonies that had been manipulated were examined, and all queen-cells were found to be destroyed. The old colonies were then placed on their original stand, removing the one frame of brood from the new hive, destroying all queen-cells on it, and placing it in the old colony. Any bees that remained on the starters were transferred to the old colony. The extracting super that was taken off the new hive was again placed on the old colony along with the bees it contained, making one very strong colony. The fourth colony that was found preparing to swarm, was treated after four days the same as the three former colonies. The other two colonies did not swarm during the season. At the close of the season we had six very strong colonies, with plenty stores for winter and 468 pounds of extracted honey.

Forced or Shaken Swarms—Mr. Pettit's Plan.

For this test six colonies of bees in eight-frame Langstroth hives were selected, weighing 49¾ pounds each. Examined on June 10th they showed no sign of swarming; there was abundance of brood and considerable new honey. June 15th a second examination was made; four colonies in this row were preparing to swarm.

Hives previously prepared for swarms, each contain in the order named: Two dummies, one starter, one worker comb, two starters and two dummies, eight in all. One of these is brought and set on a stand directly behind the hive to be treated. The operator removes the two dummies from the right or further side of the new hive, and shoves over the remaining contents so as to leave empty space next hives. The combs nearest the operator are lifted from the brood chamber, and shakes it almost free of bees, and places it in the new hive next the left wall. The next comb has a double space for shaking off in the old hive. It takes its place beside the first, and the return motion of the hand carries the dummy from the new hive to the old one. Comb No. 3 is shaken, carried to the new hive, and dummy No. 2 is brought back. The fourth comb exchanges with the first starter, and so on. When the eighth comb has been shaken in its own hive and transferred to the new, the old hive is filled out with the remaining dummies. We then put supers on again, close the hive and the bees have been swarmed.

The two remaining colonies did not swarm during the season.

On the seventh day after shaking, the four old colonies were removed to another location. Most of the bees that were flying went with the shook swarm, leaving the old colony so weak that it did not have any inclination to swarm, and only made sufficient honey to carry them over winter.

At the close of the season from this test we had 10 colonies and 432 pounds of extracted honey.

Mr. CHRYSLER: I do not think I can say very much on this subject. It is merely the result of Mr. Fixter's experiments, and he has shown us what they were. I am not at all surprised at these results, because I think in Mr. Sibbald's plan they will work out in the way he has stated. I have tried that plan but not with a view of increase. To have increase, I do not think it is as good a plan as some others I have tried, but I think probably it will be a success where he returns the old queen to the original stand after a certain number of days. I am not prepared to prove that that is always correct, but I should judge it will work out for increase. I like to do that, but I do not think we get the results in his way of doing it as we get from other methods. I tried four that way, and I gave them every chance to swarm. When the young queen hatched out I found that two out of the four swarmed, but they were easily hived again as they were in my bee-yard, and they gave no further trouble during the season.

I do not think I got quite as much from them as I would have had from shook swarms. I am only giving my experience, but it might work out differently in some other cases. As to Mr. Pettit's plan, I am not at all familiar with it. But I do not see that I can bother with dummies or anything like that around a bee-yard. I have been in the supply business for the last fifteen years, and I do not think there are many dummies supplied. Maybe they are so easily supplied that the bee-keepers supply them themselves. I have never been asked for them, and I do not know what they are like. (Laughter.) But I can understand that these bee-keepers are progressive men, and they have their excuse for using them, and I guess they must be all right.

With regard to Mr. Fixter's experiments, I do not think he has given us all that he tried. Mr. Fixter, through these years, has given us some very sensible and good ideas. He has been very thorough and honest in his experiments. He has given us the results of his experiments year after year. Sometimes we want some knowledge very quickly, and we have no way of referring, and if we only had a text book with all these experiments in I think it would be a good idea. Our country is in the north and is not altogether like those in the south.

Mr. PETTIT: I would like to say a word or two about the paper just read. For one thing, Mr. Fixter has, in my opinion, not allowed for the smaller hive. He has contracted the eight-frame hive as much as I have contracted a twelve-frame hive, and that in my opinion very much damages the system, because if I undertook to get a swarm on four frames I would not keep them there for long. That is one thing certain, because I think it is too small. Of course it is some time since I described that system, and I hope I have grown a great deal since that system was described. I would not use that system at all for extracted honey, but it is all right for comb honey. For making extracted honey I don't believe in breaking up the stocks at all. I do not believe it is necessary. I must admit that I did some of it this year, but largely in producing comb honey.

But, properly managed, I found it was not necessary to break up the stocks at all, and on that account I objected taking comb honey.

Mr. SMITH: How much drone comb did Mr. Fixter find on the Sibbald plan?

Mr. FIXTER: About half.

Mr. SMITH: How would that compare with any system that didn't supply the combs?

Mr. FIXTER: I tried to carry out those experiments in the way they were planned, and I would be very glad to have any suggestions to continue this work. I would like to get some more opinions from this meeting. If Mr. Smith will suggest anything I will be pleased to report on it. I like to carry on these experiments for a few years. I would not like to say which system is the better.

Mr. N. SMITH: It seems to me everyone had a way of their own. I do not raise anything but comb honey, and I do not break up a brood chamber, nor do I use any dummies. Out of about 170 old swarms last spring we had 2,500 boxes of honey, and I am putting away 183 swarms for the winter.

Mr. DICKINSON: I would suggest instead of hiving on starter you can use extracted combs to good advantage in the brood chamber temporarily. I think I may have started on Mr. Sibbald's plan, but I have drifted. I would just like to suggest that where you have to take those starters out and have a lot of combs and have to store them up, if you have nice clean, extracted combs, simply put them in the brood chamber.

Mr. SIBBALD: That is for shifting swarms?

Mr. DICKINSON: Yes. You simply have to move the colony to the other side. You have your extracted combs on the side. We simply take the old brood nest, lift up the frame of brood, and raise up the extracted combs with the honey. It is very simple, and I think you can see the advantage. You have the comb in store instead of using foundation. Of course it depends somewhat on the size of your hive.

Mr. TIMBERS: Would there not be new colonies start in next day?

Mr. DICKINSON: If the flow is so excellent that such results would be brought about, then you must rise to the situation.

Mr. CHRYSLER: I do not think you will find any drone comb in the one I tried. I got all nice worker combs, because it was from the young queen, and I think that is one of the points to be considered.

REPORT OF THE INSPECTOR OF APIARIES.

The detailed report of the Inspector of Apiaries presented to the Department of Agriculture shows that he visited bee-yards in the counties of Brant, Grey, Halton, Lincoln, Middlesex, Norfolk, Ontario, Oxford, Perth, Simcoe, Wentworth, and York.

In all, 101 reports of inspection were sent to the Department. In some instances what was reported to him as foul brood turned out to be only starved brood.

COST OF INSPECTION.

Services, 65 days, at $4	$260 00
Travelling expenses	194 15
Total	$454 15

WHAT MAY BE DONE TO MAKE THE ASSOCIATION MORE USEFUL TO BEE-KEEPERS?

By Morley Pettit, Villa Nova.

Our Secretary has given me a rather difficult and delicate mission in asking me to take the pulse and temperature, as it were, and prescribe for this august Association. No doubt the patient will take the medicine kindly, and the other members will suggest many other remedies which have not occurred to me.

In forming and carrying on an association the first thing to consider is the aim of the association—its excuse for existence. While I have not seen in the by-laws the object of the O. B. K. A., I consider it is or should be, broadly: The advancement of the bee-keeping interests of this Province. This is effected, first, by an annual convention where the members meet and face to face discuss and exchange ideas on both the practical and the business side of bee-keeping.

Second, by the continual and persistent effort of the directors and officers to develop bee-keeping as a business and overcome the obstacles in its way.

In the years that I have been a member of this Association, I find a certain lack of business method, a failure on the part of members to take the Association and its mission seriously. The conventions are looked upon too much as social gatherings, owing largely to the fact that with many bee-keeping is treated as a side line whose profits are very much of a bonus---almost clear profit. With them the convention is an outing where acquaintances are formed which ripen into friendships lasting and good, but the business end of the convention, which should be foremost, is overruled. Sessions are delayed in starting by the non-appearance of officers and members. Discussions often became prolonged and pointless, so that the time of the convention which at a very low estimate on the expenses incurred by members is worth ten or fifteen dollars an hour is worthlessly wasted. Another point which is more delicate to touch upon, yet is vital to the good work of the Association, is the fear which most of us have to a greater or lesser degree that someone's feelings may be hurt—either our own or those of some friend. Can we not rise above this, and as sensible business men drop bickerings and personal preferences and petty animosities, and toughen up tender skins, and study what is best for the Association as a whole.

What can the Association do for the advancement of bee-keeping in Ontario? Something has been done in the way of advertising Canadian honey at great fairs and exhibitions. The Honey Exchange Committee is doing a good work in collecting crop reports and giving a sort of weatherman's forecast prices. Good literature is provided the members in the form of "*The Canadian Bee Journal.*" The Transportation Committee is battling with the problem of better freight and express rates on honey, bees, etc. Something has been done in the way of legislation against the adulteration of honey, and for the checking of disease among bees. As to how the foul brood law is being carried out, I shall leave to others on the program better versed in the subject than I. We have also an annual Government grant of money. But is there not room for more to be done in this line? Other branches of agriculture are receiving strong Government support in the way of opening up markets and the proper grading and distribution of products. How about honey markets and the grading of honey? Fruit, dairy products, etc., must be inspected by a qualified Government official before going on the market; honey can be shipped in any careless form, and the careful shipper must take a share of the consequences. Other lines are put to the front, but bee-keeping is crowded back. Poultry-keeping, fruit-growing, and flower culture are considered dignified occupations, but bee-keeping is a *joke*. We are "beemen," or "honeymen"—spoken with a smile.

Why should this be? Wherein does the remedy lie? In ourselves. I find bee-keeping taken more seriously in some parts of the country than others. I attribute the difference to the attitude of the bee-keepers themselves. Self-confidence and ability inspire the confidence of others. But we need the help of the power that is helping others along. Are we using the help we already have to the best advantage?

We already receive a considerable amount of money from the Government. A large portion of it goes to defray the expenses of the directors while attending the regular conventions of the Association. More of it goes to the local associations, and is used by them to send delegates to the convention. Is this the best way in which the money can be used for the advancement of bee-keeping? If the directors work earnestly during the year to organize and enlighten the bee-keepers of their respective districts, and to increase the profits of our business, and come prepared to report progress at the convention; if the delegates seek to promote the interests of their respective associations while at the convention and go home filled with practical ideas for the benefit of those who sent them, it is well. But why this double expense? Why not let the local associations be district associations, and let each district association appoint its delegate to the Provincial Convention? This delegate being the representative of his district should become the director for that district of the Ontario Association. He, if he truly and conscientiously represents the association sending him, should be entitled to his expenses at the annual convention. I consider this is the only way in which the districts can be truly represented, as we will all admit that the attendance at our annual conventions, aside from those having expenses paid, is mostly local.

Another plan for electing directors would be that suggested by me in *The Canadian Bee Journal* some time ago. Supply each member with a list of members arranged according to their districts and let voting be done by ballot. The present system of open voting cannot in my estimation be too strongly condemned.

Mr. Byer: I may say that I agree almost entirely with what Mr. Pettit has said, except with regard to the election of officers. I do not know that I would approve of that. But I think that it would be better than the method we have in vogue. As to the social side, it has been criticised, but I do not know that I would underestimate the social side. It appeals to me to come here and meet so many bee-keepers from all over the Province, and have a talk with them. About useless discussion, we seem to unconsciously drift into details, and I do not see how we are going to get away from it. But I think if we tried we might modify it a good deal. In past years when it was suggested to make certain changes in the constitution, I remember there was some personal feeling ascribed to those members, when probably they voted for what they thought was the good of the Association. But I think we are rising above that. We must use a little charity one with the other. Now, I think the Honey Exchange is doing a good work. We have been told that we should not look for Government aid, but we find kindred associations are getting larger grants than we are, and I think we are entitled to such grants the same as they. I think the development of the market is one of the openings that this Association should work on in the future. I am not prepared to say how that should be done. Some may disagree with me on that. I think there should be some system of honey inspection. Some say that you can send honey indiscriminately to the Old Country, and it does not interfere with the market; but I think it does. If a barrel of apples is sent to England of an inferior quality, and it is branded "X," it hurts the Canadian shipment generally. I am not prepared to say how we can overcome these things. Mr. Pettit referred to literature, but I think we have all the literature we require. We do not get time to read what we have. And he also spoke of the election of officers. I think our system is not good. I am not going to make any suggestions as to it, but I am of the opinion that it is not sound. I believe that sometimes the directors are elected from a feeling of courtesy, and not thinking of the good of the Association.

Mr. Pettit: I think Mr. Byer misunderstood me on the social question. I enjoy very much to meet my fellow bee-keepers from year to year, but at the same time we should remember that we are here for business.

Mr. McEvoy: I cannot agree with these gentlemen on the question of electing the directors. When we have men coming long distances year after year, they get to be the best men in the country. They come here, and let the people elect them. If you are going to have them elected in their own locality, they are going to send us green things, you see (laughter). That is natural. There was something said about us being a little bit too thin skinned, and I agree with Mr. Byer on that. Let us be a little more pleasant. Let us speak plain if we want to, but let us be a little bit more sociable. Give the British people good extracted honey, and you do not need to have an inspector to tell them that is good. If I turn out better honey than you I am going to down you, and it is the same way there. In a barrel of apples you can top up a barrel, but you cannot top up a jar of honey.

Mr. Hall: I agree with what has been said on the question of electing officers year after year. We all know they come a long way, and they get their expenses paid and others are left at home; but we should not hold offices year after year. I think if the local people elected their representative they would send representative men, and I think the result would be that you would have your local societies better attended. I certainly think we should have our election by ballot,, and we should have any member in the Association open to election. It would be a benefit to have new men, because new men have new ideas.

Mr. Hutchinson (Michigan): We have had the same trouble over on the other side that you have here. When a man gets in office he is there as long as he lives. But we have been trying to make an arrangement over there in the National Association so that you could elect a new man if you found you had made a mistake. We have been having nominations by mail, and the two men that got the most votes would be the candidates, and that gives us a chance of voting out a man if we think it wise to do so. You never can put anybody in the position unless there is an opposing candidate. So we have been trying that for one year and we are trying it again this year—a postal card ballot. The ones who get the largest number of votes are the candidates.

Mr. Dickinson: I just want to say a word in connection with the best interests of the Society. In our Militia Department it was found necessary to make a few changes, and they were asked to retire with rank, so that good men could take their places. Now, I think this could be done in connection with this Association. I am not saying we have not good men on our Board; I think we have. Another thing, we must have them from the different Districts. We must have the Province represented so that we shall have men from each District; but if a man has to be in office for ten years, I think he should be superannuated. I have in my mind good men in the different districts who should be directors once in a while. You all know that I do not wish to be a director, but I am just speaking as I feel on the matter.

Mr. Holtermann: We have an Act on the subject, and unless we get that Act amended we can do nothing. But I think after hearing what Mr. Pettit has said, and what Mr. Hutchinson has said, there is something we might do, and that is for the Local Associations to nominate a man. This matter of men being in office so long can be carried to extreme, and putting good men out can also be carried to extreme.

Mr. McEvoy: Where there are no Associations in these outlying districts what are you going to do?

The President: Organize one.

REPORT OF REPRESENTATIVE TO THE TORONTO INDUSTRIAL EXHIBITION.

Mr. Grainger, the representative of the Association at the Toronto Industrial Exhibition presented his report as follows:—I attended all the meetings of the Industrial Board to which I had a right as your representative. I may say that the bee-keepers generally do not take as much interest in the exhibition as they should. Some of you do not exhibit, and you come to the conclusion there is no profit in exhibiting. I think this is a mistake. If you would try it for a year or two, find out how many questions there are to answer in that way you would see that the people were being educated through the exhibition. Another thing which shows how little a great many know about bee-keeping. At the last exhibition one lady and her friends came along to a hive, and they were interested in that, and she commenced to explain. She said, when she started out, that there was a king bee in the hive, and when the workers did not do their work right the king bee chucked them out. That is only a sample. We ought to support the exhibition for educational reasons if for nothing else.

Another thing I find at the meetings is that the bee-keepers are regarded unfavorable somehow. Florists and other people—I have had something to do with it—in asking for privileges and grants, and so on, are received better than the bee-keepers. I do not know why. My experience is that they are honest, upright, hard working people. I do not think the florists are any better, and yet they get along better; they have more respect paid to them. I think it is perhaps because they go to work in a different way to ask for what they want. There was nobody there to speak for the bee-keepers. I do not know that the Industrial Board are to blame, but the men they put on the Committee practically know nothing about it.

Another thing: We are classed under the Agricultural Committee, and the honey comes in a sub-committee. We get our chairman perhaps at first to consent to what we think would be desirable for the bee-keepers; that comes up before the commitee, but that has still to go before the general Committee on Agriculture, and by the time you get there you have people harder to deal with, because there are other interests that come in. If they promise to give us some improvements in the buildings it still has to go through the Board of Control, and be passed by the Council, and then the thing is pretty near lost by that time, unless it is followed pretty closely.

I have tried to do the best I could. I got a great deal of help and they used me well. I tried to represent the needs of the bee-keepers. Originally bee-keepers have been contented to sweep their own buildings out and things like that, and they did not even have a broom; but this year we did get a broom. We have been too modest. They pay a caretaker in other buildings, but have not done so in the Honey Department.

We want a new building badly and we have been agitating for it, and trying to get improvements, and it came up in the committees, and the manager, Dr. Orr, and all agreed they would do the best they could for us. But when it comes up there are so many other interests, and the men that are fond of horses and represent that industry beat out the agricultural people. They have the consent of the Association to build an arena that will cost a very great deal of money, and the prospects of our building for the next year are very poor. They have a plan to unite all these industries in one building, in the form of a cross with four wings. One devoted to farm produce, one to flowers, one to honey, and one to fruit.

Another thing which I think would be good would be if your representative would be considered as an officer of the Association, and could attend the meetings, so that when things like this come up he could let the executive know what is going on. There may be a meeting in the city any day to consider some of these buildings, and he ought to be in touch with the rest, so that he can represent at those meetings what the bee-keepers desire.

I would recommend, if it is in order, that there be a committee, so that we can be represented on that Board. They would be glad to hear us, and they would notify us when meetings are held.

Mr. Holtermann: I know that the rules and regulations of the Association are such that the bee-keepers can only have one representative.

Mr. Grainger: At the meetings where these things are discussed they are glad always to have others come and express their views—that is, as a committee. Of course they are not recognized as voters on the Board of the Industrial.

Mr. Shaver moved, seconded by Mr. Holtermann, that the report of Mr. Grainger be adopted, which, on a vote having been taken was declared carried.

REPORT OF THE HONEY EXCHANGE COMMITTEE.

Mr. Craig presented the following report:—

We met at Streetsville and took everything into consideration, that is, the season and the reports in the different districts. All the members of the Association have had our report in the form of a circular that was sent them, which we trust has been satisfactory.

Mr. Shaver moved, seconded by Mr. Edmundson, that the report of the Honey Exchange Committee as presented by Mr. Craig be adopted. Carried.

REPORT OF THE TRANSPORTATION COMMITTEE.

Mr. Holtermann: A committee was appointed to try and get reduced freight rates upon honey. We met at the house of Mr. Sibbald in Toronto in the spring, and upon going over grievances, as it were, I think we all came to the conclusion that we had much more ground for grievance than we even realized when we took the matter in hand. Mr. Couse wrote to the chairman of the Canadian Freight Association, which meets and at which the different railway companies are represented. We laid our grievances before them, and they came to the conclusion that they would not grant us anything. This, of course, took time. We had made our application before the Railway Commission at Ottawa, and the grievances were put before that body, and since this Convention has started we have a telegram notifying us that they are prepared to meet us between the 4th and 9th December. For my own part, we do not want anything more than what is just and right, and we are not getting that at present. We feel hopeful of a favorable result, that we will get railway classifications and lower freight rates upon honey than we had in the past.

Mr. Couse: After the committee met at Mr. Sibbald's, I called on Mr. Earl, secretary of the Freight Rate Association, and had a conversation with him, and got the freight books and told him we were anxious to meet the Freight Association in Toronto if possible. However, we learned from them that they were meeting in Montreal all summer. Under those circumstances, we knew we could not go to Montreal, and I wrote a letter giving a description of what we wanted, asking for different changes in the rating. It took another month, and that was brought up then, and it was a month or so after that before I got a reply to that letter. They finally decided they did not see they could do anything for us. Then our next step was to attempt to get hold of the Railway Commissioners of the Government. I wrote Mr. Creelman in the first place as to where I coud see Dr. Mills. I was informed they were having a vacation, and the Commissioners would not meet during July and August. Mr. Creelman said I would probably find Mr Mills in Ottawa. I then found they were going west for a length of time. They replied that perhaps they would meet us in Toronto on the 4th of this month. We attempted to get a hearing on the 4th and we could not do it. Now this telegram comes to-day that they probably will be able to meet this committee some time next month.

Mr. Holtermann: We saw the Express Company. We really had no authority to deal with them, but if you see fit to re-appoint this committee I think it would be well to also cover the Express Companies. All other Associations have a special rate while honey has to pay a regular rate. An important agency told me they thought we might be able to get that, and we should get it.

Mr. Pickett moved, seconded by Mr. Laing, that the report of the Committee on Transportation be adopted. Carried.

AFFILIATED SOCIETIES' REPORT.

There have been eleven societies in affiliation, namely: Glengarry, Halton District, Middlesex, Norfolk, Brant, York, Oxford, Simcoe, Haldimand, Russell and Victoria.

Nine of these societies report a total membership of one hundred and twenty-five, one society has not reported the membership, and one has not sent any report to date.

Two hundred dollars were divided among the eleven societies, and the greater part of this money has been expended according to the by-laws.

Very few of the reports include a full statement of the number of hives of bees owned by the members and the amount of honey produced. This may be partly owing to the reports that have been received by the Honey Exchange Committee somewhat taking the place of them.

W. Couse, Secretary.

DIRECTORS' REPORT.

Mr. Holmes presented the Director's Report as follows:—

Your Directors for the year 1905 beg leave to report as follows:

The year just closing has been a fairly good one among bee-keepers in this highly favored Province of Ontario. The bees throughout the Province came through the exceptionally hard winter of 1904-05 with a comparatively small percentage of loss.

In certain portions of the Province the honey-crop has been good, both in quantity and quality—while in other localities the yield has been much below the average. It is gratifying to note in this connection that prices are good and likely to continue so. The sum of $200.00 was set apart for the affiliated societies. This has been expended in accordance with the by-laws.

The Canadian Bee Journal has been given to members of the Association during the year.

Copies of the law regarding spraying of fruit trees, and copies of the foul brood circular were mailed to the members as recommended.

The sum of fifty dollars has been granted to the Fruit, Flower and Honey Show.

Your Directors have recommended certain amendments to the foul brood law which in the main have been approved in open convention.

Your Directors recommended the names of James Armstrong and Jacob Alpaugh for foul brood inspector and sub-inspector for ensuing year.

It is pleasing to note that the finances of the Association are in a healthy condition. All of which is respectfully submitted.

M. B. Holmes, Chairman.

Mr. Holmes moved, seconded by Mr. Brown, that the report be adopted. Carried.

SECRETARY'S REPORT.

Mr. Couse: The Secretary's Report is very brief. There are 155 members on the roll and eleven Affiliated Societies.

Mr. Brown moved, seconded by Mr. Pettit, that the Secretary's Report be adopted, which, on a vote having been taken, was declared carried.

The President called for report of the Inspector of Apiaries, who had not a report ready.

After some little discussion, Mr. Emigh moved that Mr. McEvoy be given two weeks to send a report in to the secretary, and if it is satisfactory to the executive committee, that the secretary send it on with the Government Report.

Mr. **Sparling** read section 12 of the Foul Brood Act.

Mr. **Holtermann**: I do not endorse what has been done, but I will second Mr. Emigh's motion.

The **President** put the motion, which, on a vote having been taken, was declared carried.

BEE-KEEPING IN CANADA *Versus* BEE-KEEPING IN JAMAICA.

By Mr. Arthur Laing.

I am glad to be here to-night, not because I have the privilege of addressing you, but because for several years, through one cause or another, it has been impossible for me to attend the Conventions. I suppose the object of this subject is to find out as far as possible what the advantages and disadvantages, as the case may be, are of bee-keeping in Jamaica as compared with bee-keeping in our own country. After considering the matter for some time the only thing that I could see that a bee-keeper in Jamaica had any advantage whatever over a bee-keeper in the United States or Canada seemed to be in one point, that of cheap labor. I may say that it is cheap in more ways than one. You would find your helpers asleep in Jamaica unless you watch them very closely. But you will be interested in knowing what you have to pay for a man for that line of work. About the average price would be a shilling a day, or in our money, twenty-four cents. When I arrived there in Jamaica I took charge of a yard of about five hundred colonies, and I found a very faithful colored man in charge, and I considered him, as my experience went, a perfect jewel. He was slow, as most of them are, but he was very faithful indeed, and nearly all the time when I would go down I usually found him at work at 7.30 in the morning. Now, this man was drawing the tremendous salary of five shillings a week, and that without board. That is an interesting point; he boarded himself out of that. They could do that very cheaply, because most of the people produce bananas, and the nights are dark; and they are also good hands at climbing cocoanut trees, and they knock down the cocoanuts, and so in that way it does not cost very much. Now, after thinking of the matter for a time, this question of labor is the only point that seems to give Jamaica any advantage over Canada or the United States so far as bee-keeping is concerned. If you are so disposed, you don't even have to pay that price, because you can get a good strong robust young woman for the small sum of eighteen cents a day, and she will not think anything of putting a super weighing fifty pounds on her head and taking it away, and I will guarantee she will fill the bill about as well as the man. Many of you think there are other advantages, but I assure you there are many disadvantages.

Now I will return to the difficulties with which you have to contend. The first thing I ran up against was moving an apiary. Now, you know what a time we have in moving an apiary. The roads are very rough and the waggon may be not very much good; but we can usually get something in the line of a wagon and something in the line of a spring, and usually we can get a wagon that can carry about forty or fifty hives. But in the island of Jamaica everything is carried on a two-wheeled cart, and as a rule the axle is not made in the best factory in the country. Usually, as you go along, the wagon gives out or something happens, and you will not arrive with your hives unless they are fastened on very securely, and your bees are likely to go, even if the hives do not. You have to close the entrances, and, by the way, they have usually a dozen entrances to a hive in Jamaica. I was going to remark that while they were returning on a trip one of the supers dropped off. That was on the return trip when moving 125 hives, and I told the driver that I would not be responsible for the lives of the mules. These carts are very small and they only carry about ten or twelve hives, so that if you have to go ten or twelve miles it takes you a long time to move. Mr. Smith could tell you about quite a time moving bees.

Mr. Smith: They carry them on their heads down the mountain. They carry them for twenty-five cents a hive, and they would weigh about forty pounds.

Mr. Laing: Another disadvantage is wintering. What, you say, wintering in the Island of Jamaica? I thought they had no winter there. But, you know, "Distant field look green." On the subject of wintering, I do not need to tell the difficulties we have to contend with here, but in Jamaica we understood that they gathered honey every day in the year, and that we might expect colonies to be strong and increasing at all times. I found, however, after taking charge about the 17th of October, that from that time on for two or three months nearly, the bees seemed to be going down, down, down, and at first I could hardly understand it, and I do not know whether I thoroughty understand it yet or not. But it seemed to be because there was little honey coming in. It was not sufficient to stimulate the queen, and the result was that instead of lying dormant and preserving their strength they were out flying around, and they were wearing themselves out, and the result was they kept going down. We doubled up to keep the moths from totally destroying them. We have the moths constantly. It is different there from here, for generally there the moths are good and lively at all times, and if the colonies get a little weak they soon close in and your colony is gone. I had to place the combs on top of the stronger colonies to save them, otherwise they would have been ruined.

The next point I may speak about is the question of ants. There are red ants, duck ants, little ants, big ants, and all the ants, uncles and neices and the whole family, and I do not know but that there are a few more. (Laughter.) You can stand anywhere where chance might find you, and look first one way and then another; and, I believe you could count anywhere from ten to a thousand ant nests. They are on the gate posts; they are on the roofs of your buildings. You will find them underneath the hives. They are on the trees, and they are half way up the trees and all over the trees, and practically all over. They are quite a size, and they look as if they were made of wood. They seem to stand the water at any rate.

In the first place, with reference to these red ants. (I had a notion to bring back quite a number of them with me. I think I could have done well with them.) I started in with five colonies and they were in pretty good shape too. I let them run along for two or three weeks and they did not seem to be getting ahead very rapidly. Finally I looked into one of them and it seemed in good shape, but when I went back a few days after a lot of bees seemed to be in the bottom of the hive, and there was a good strong colony of red ants. I tried another, and I found the same condition again. They were all dead in the bottom of the hive, and the ants were good and lively. They say that on occasions some of these red ants will even tackle good strong colonies and destroy them. Then next as to the duck ants. These ants seem to be perfectly harmless so far as biting is concerned, but you want to make your hives of cast iron or steel, otherwise you will be likely eaten up. They will build a covered runway along your hive, and they honeycomb the wood so that in a short time it is rotten and useless. Nearly all the hives down there are made from the coal oil boxes used on the railroads. They are desperately hard, but this kind of material did not seem to bother the duck ants. They are very destructive so far as the hives are concerned, and they are a great nuisance.

The next item, and the last one which I wish to speak of, is the marketing. I do not intend to take up a great deal of time. Now, in reference to the price of honey there, I have written a little on that in the *Canadian Bee Journal*. The price that seemed general there was, I should say, on an average from two to two and a half cents a pound, and of course the package was furnished by the buyer, or if you furnish it they pay you for it. In extra cases of logwood honey, you might get three cents a pound. Now, you can see that anyone in Jamaica must keep three or four times as many bees to make as much money as you do in Canada, because here it is from six to seven cents. So that we get here from two to three times as much as they do there, and they have to keep that many bees more, and they have got to have a great many more hives, honey knives, smokers and help, etc., and that means a great lot of capital invested. So that from this standpoint, it seems to me there is very little in Jamaica for a Canadian or United States bee-keeper. Some may ask, well, that is in the island of Jamaica, what about shipping honey out to the old country? I investigated that point. In the first place if you are shipping out you have got to buy your package, and I am pretty certain that you will not get anything for it at the other end of the line. Now then, if you ship on your own account, you have to pay the wharfage in Jamaica and the freight charges going over to the old country, and these are two considerable items. Mr. Smith and I have had considerable experience in pork barrels down there; that seems to be the only thing you can get at a reasonable figure. They will not allow you anything at the other end, so that naturally they take the cheap article, and the pork barrels do not add one iota to the quality of the honey, and being an old barrel, there is the possibility that the sailors may have the privilege of walking around in a lot of your honey, and you will be the loser. I am just getting at the expense you will have to encounter in shipping to the old country. I have here a couple of letters that I received in correspondence with some of the British buyers in reference to the Jamaica and Canadian honey, and they give some interesting points. I find the charges for wharfage, freight, dock charges, interest on freight charges, customs duty, fire insurance, brokerage and selling expenses, and they count up to nearly one-third of the price. I cannot see how it pays the shippers to ship at such a price after paying all those charges, and no higher prices seem to have been realized for some years past. One thing about Jamaica honey is that it will not keep sound like other grades. It will go off in quality. This may account in some measure for some price results.

Some of them are not as particular as they might be with the care of the honey. When the logwood flow comes on, and there is dark honey coming in at all times, immediately the logwood honey comes in they wish to extract every pound of it, and if they do so it is quite thin, and if they leave it, it gets mixed with the dark honey, and it lowers the quality in that way, so that they have to take the chances of the two evils. And then there are the old barrels, and by the time it arrives in the Old Country it is not likely very first-class. I have here with me three different samples of honey. It would have been better if there was a light behind them so you could see what they are like. This first sample is our own white clover honey, the next sample is the logwood honey, and the next was from Christmas Bells. You can see it is a very dark honey, and if you will notice you will see there is a very great difference in them, so that they are not to be compared with our white clover honey. The dark honey sells at sixteen shillings, and as a shilling is twenty-four cents, you can see it amounts to $3.75 to $3.80. So that when you take one-third out of it they are not going to realize very much more than they did in Jamaica. That reduces the price down to two and three-quarer cents. Then, as I said, if they chance to lose a barrel of honey on the way over, it is probable that the price will be very much lower than it is in Jamaica. As to the yield,. that is a point that I covered very extensively in the *Journal*. I left there on March 30th, and they claimed that the dark honey would keep coming in for a month after that, but judging by other claims they had made, I did not pay much attention to them. But I extracted from those 500 colonies an average of 25 pounds per colony, at two and a half cents an average price. That is exactly what I got. I asked them to let me know how much dark honey they got after I left, but so far I have not heard. I asked Mr. Smith how much dark honey he had taken, and he gave me to understand it was not too much, so you can judge for yourselves on that point.

Mr. SMITH: I may say there has been no honey taken off since last February. As far as the dark honey is concerned, I do not think there was any taken off.

The PRESIDENT: We have two American visitors here with us. Mr. Hutchinson, we will probably hear from to-morrow, and I am sure we would all like to hear from Mr. Hirschiser, of Buffalo.

Mr. HIRSCHISER: It has been a great pleasure to me this time, as well as at all other times, to meet the Canadian bee-keepers in their Convention, and to listen to the remarks that have been made and the wisdom that has been displayed. I always learn something when I come to Canada. I think that the average ability of the Canadian bee-keepers if fully up to the average of bee-keepers in any of our States. There has been so much said that I do not think I could add anything. There was one bee-keeper here who reported this morning 2,500 boxes of comb honey from 170 colonies, and increased to about 180. I think that is a very excellent report. I do not mean to question that report, but there are some who are a great deal more successful than I have been and I would like to know how this thing is done so that I may do likewise. Mr. Fixter, yesterday, gave a very interesting account of his experiments in liquefying honey, and so on, and it occurred to me that the bees are about as successful in keeping their food liquid as the bee-keeper. They gather it in liquid form and cap it, and it probably does not reach over 98 degrees—probably about blood heat in the hive. Now, it occurred to me that if experiments were made in the line of keeping honey in the liquid state and capping it up in about the temperature it is when the bees are capping it, that we might preserve it in a liquid state without raising it to a very high temperature; and, another thing, we might be able to preserve the flavor in that way. The higher the temperature the more flavor I think we lose. I believe that a great quantity of honey is injured in the process of liquefying it.

I think it was Mr. Grainger who reported about his experience on the subject of educating the people through the expositions. I have had some experience in this line myself, and I know how ignorant the public are. Perhaps I can illustrate this. At the Buffalo Exposition we had quite an exhibit of honey, and we had a practical apiary there, and a lady and gentleman came along and after admiring the exhibit for some time the lady approached me and said: "Why is it that while you hold your breath a bee won't sting you?" I said that I didn't know that was the fact. "Well," she said, "it is; and just to prove it you may put a bee in my hand." I did so, and it didn't sting her. Then she began to rub it a little, and it stung her. "Oh!" she said, "I forgot; I breathed." And she said, "Give me another one." And that stung her also. (Laughter.) On another occasion some visitors came along and looked at the bees and wondered at the work they were doing, and finally one said, "What do you do to feed them? Do you put bouquets in the hives?" (Laughter.) Now that shows you how much the general public know on the subject.

As I keep three out-apiaries the question of the prevention of swarming was of interest to me. In one yard I make some comb honey and allow some swarming, but I am not able to be at the other yards or employ anybody to be there. I will tell you my method of procedure. It is effective, and I get the honey. When the bees begin to become populous in the hive I put on another storey and allow the queen the range of both the upper and lower storey; and when the colony gets strong and are likely to swarm within a few days—anyone can tell by the behavior of the bees—I smoke the bees, open the hive, and look in until I am sure the queen is in the lower portion of the hive. Then I remove that to another hive, and substitute another lower portion, placing it on another stand. Those are nearly all ten-frame hives. Now there is brood in both stories, and the portion of the hive that I have removed to another stand will not swarm, as it will be depleted, because they will go back to the old. Give the other one a virgin queen, or if you can't attend to them they will get a queen themselves. As I say, you can allow them to raise one, but if you want them to have a queen as quickly as possible, and you have time, it is a good idea to introduce a virgin queen or give them a ripe brood as well, that is when it is full of brood. Now then, by the time this brood is all capped over, in the white clover honey flow, this upper story is ready to extract—by the time they get a laying queen again the honey is ready to extract. And if the season is a long one, and you can put another one on, you will get another partial crop of honey. I believe that is a good way if you are running for extracted honey. If I had a little more time I might take up the subject of wax extracting. How many colonies do you suppose there are in the Province of Ontario?

A MEMBER: About 10,000 bee-keepers, and about 200,000 colonies.

MR. HIRSCHISER: Now for some years I had about 200 colonies, and I found that the amount of wax I was able to obtain from these colonies of bees was about 200 pounds, or about a pound of wax to a colony of bees. I saved up my slumgum and I set about making some experiments with it, and I found I was throwing away about 40 pounds of wax, or about 20 pounds for 100 colonies of bees every year. I thought I had been getting the wax out clean, but I found that was the amount I was throwing away. Now from this I deduce there are about 40,000 pounds of wax being thrown away in the Province of Ontario, if you are no more successful than I was. I don't say that you are all doing this, but you cannot convince bee-keepers that they are throwing away wax.

MR. GEMMELL: I am getting all the wax out of my combs.

MR. HIRSCHISER: I am well satisfied that Mr. Gemmell is making too broad a claim, because no person gets all the wax out of the combs. I can get it to within one per cent. But all I wanted to do was to call the attention of the bee-keepers to this matter. The wax extracting, and a good many other things, are in a primitive stage, as you will find out within ten or twelve years.

ADDRESS.

By Hon. Nelson Monteith, Minister of Agriculture, Toronto.

I am sure modesty is a virtue amongst public men, so I will speak to you very briefly to-night, especially so as I feel less at home with this subject than with some others. I feel that I am called upon to speak to men who are experts in their business, men who are specialists. When we consider the great interests involved in the bee industry in this country, I think it will be admitted that your efforts are accomplishing great results. I have listened to what has been said in regard to the great bee industry of this home Province, over 220,000 square miles in extent, and I believe bees may be raised on the greater portion of it. That is what they say up north. And at present I suppose the bee industry is confined to about 20,000,000 acres. That is about the same amount of land under cultivation or occupied here, and there is a great, big territory yet to be occupied by the people that are to be. This bee industry represents an invested capital of about $1,200,000, a very large amount of money, so that you have in your keeping quite a large financial asset for this Province. I believe from what I have had the pleasure of seeing up at the exhibition at Massey Hall that you are keeping well to the front in the matter of the quality of your production. I am glad of this, but I believe the bee men are modest like myself. They do not apparently put before the public the value of honey as a food in the way it should be. It hasn't been advertised in the way it might have been, because you have been satisfied to produce the article and leave it there. You haven't pushed the business as some other men have in other lines. I am just saying this from my own observation as a citizen amongst you. The use of honey is very limited as yet, and it is one of the best natural foods produced, and I see no reason why it should not be more largely used by us as a people outside of the export trade altogether. One pound has as much nutriment in it as five pounds of pork, and when you know what pork costs, you begin to realize the importance of the comparison. There is one thing that appeals to me as a citizen of this country. I believe that in the matter of varieties of bees possibly you are well to the front. However, it is well to be ambitious to have something better. You know that for many years the old German bee was the only bee known here. After that, the introduction of the Italian was a long step in advance; then came the Cyprian and later the Austrian bee. Now they are reporting from the American Department of Agriculture a bee known as the Caucasian. I am not one of those who are satisfied to sit down and say I have the best. I am always ready to try something new and something better. When we think we have reached the ideal, then we lose ground. That is the reason why I point out these things—so that we may see whether the Caucasian is what it is claimed to be or not. You are the men that have to prove this. However, I am not here to speak at any great length. I wish you success in your business, because your business is not confined merely to honey making. It has a wider sphere of usefulness in this country—an influence that is beneficial to the fruit-grower and the seed-grower, and for that reason I sympathize with you in your work. These are some of the things I wished to say to you, knowing full well that you know more about this special work than I do. I came here largely on behalf of the Government to sympathize with you in the work—to show that we desire to uphold you in your work. I thank you. (Applause.)

The President: I am sure we are all delighted to have heard the words from the Minister of Agriculture. He is to us what the queen bee is to the hive. Without him we could not exist. His remarks about the market were along the right line. Honey is not understood in the home markets as it should be, and is not appreciated. I know I voice the Association when I thank the Minister for coming and addressing our meeting. (Applause.)

Hon. Mr. Monteith: I am sure that after your very hearty thanks I feel at a loss how to express myself, but I can promise you that in your business with the Department you shall receive our co-operation. I shall be pleased to meet with you at any time and discuss the things that may from time to time require the assistance of the Department; and you know the bacteriologist is to a great extent at your disposal. I hope as the years go on that we shall be able to extend the work of bacteriological research along lines that may help to solve some of the questions that are now difficult for us to understand. (Applause.)

The President: I will now call upon another American visitor to address the Convention, Mr. W. Z. Hutchinson. He may be able to give us his reasons for awarding the prizes so and so at the Honey Show.

Mr. Hutchinson (Michigan): It seems to me most of the exhibits were pretty good, and I have very little criticism to make. There was one point I might mention, and that is the idea of simplicity. I think perhaps occasionally an exhibitor errs in making too elaborate an exhibit. For instance, he makes a pyramid, and then scatters some flowers around the table, and then puts on flags. It makes a person think of an overdressed woman. Now, in a picture we try to bring out one idea and everything else centers upon that one idea, so that the mind will not wander from one point to another. Let it be just as simple as possible. We might put up a pyramid with nothing but the plain bottles or glasses—no trimmings, in other words. I would say that the watchword should be "Simplicity" in making those exhibits. Perhaps there were only one or two exhibits that came under that head. What we want in judging is a score card. You have five or ten bottles of honey to pass upon, and you take up one and look at it and it is a very fine color. Then you come to another and dip your spoon into it, and you find the flavor is good. But where the color is off the flavor may be better. Then a good colored one will have a very poor body, and so a person might go over them without coming to any conclusion, unless he had something like a score card to register the points. I suppose about 50 points out of the 100 would be for quality, and we test those different honeys, and get as near as we can to the best, and then we mark it down, giving them the number of points. Then we take up the question of color. As to the best color, it would be the clearest and whitest. I think that was put in 30 points, and in that way you don't know until the end of the judging who is going to get the prizes. Then as to the body. In some, bubbles will rise very quickly and others very slowly. Take the one that comes up the slowest, that one has the greatest body and we give that the greatest number of points. Then, when you get through, you figure up the most points, and the man who gets the most points gets the premium, and so on down. In that way you can satisfy yourself. Someone will say, "Why, my honey is the better flavor," and another says, "My honey has the best body," and if there is no method of judging one does not know why the other gets the prize. If we had these score cards we could give each exhibitor a card showing how his honey stood on all the different points, and then he could see why he failed. He could see where his honey lacked, and in that way there would be the educational feature, and there would be satisfaction. And more, the judges would not have to answer any questions, because the score cards would show it. Of course you must have a scale of points. And it is the same way with the comb honey. There is, for instance, the completeness of filling. I do not say how many points should be given, but perhaps 50 out of 100 for complete filling. Then there would be the scale running down the same way. Then there would be the completeness of capping and the evenness of the combs, and then I think the honey should be tested. It might seem a pity to destroy the combs, but the quality should be considered. Then as to the display. The man who has the nicest display give him the highest score on that. I think the quality should stand first. Just to make a quick estimate, perhaps, put quality at 50 points out of a hundred. Quality and flavor are really the main things. Quality would include other things besides flavor.

Q. What would you allow for display?

Mr. HUTCHINSON: It depends on what show is on. At the Fair last September someone had, I think, an idea of showing to the public granulated honey, and I think 80 points were given there. It would all depend on what you wanted to bring out.

Q. Which would you give second place to, body or color?

Mr. HUTCHINSON: I think I would put it in this order: Flavor, body and color, 50, 30, and 20 points.

Q. And what for display?

Mr. HUTCHINSON: If you are going to have display you would have to re-arrange the whole thing. I think that out of 300 points I would put perhaps 20 per cent. for display, and then make the proportion the same for the others.

Mr. HOLTERMANN: Would you not have to take into consideration the size of the display? A large quantity would make a big display and a small quantity would not.

Mr. HUTCHINSON: Exactly. The premium list should state the number of points.

Mr. McEVOY: What about wax?

Mr. HUTCHINSON: Well, some persons would give a premium for light-colored wax, and others would prefer a bright orange yellow. My preference is the yellow wax. And then there is the cleanliness of it; whether it is full of dirt or other foreign substances. And some might have a preference for hard or soft wax—the texture. I think I would put about a third each on the color, the cleanliness, and the texture.

Mr. HIRSCHISER: I would like to ask which you consider the better wax, that made from white cappings, or that from the old combs, which is a bright yellow?

Mr. HUTCHINSON: So far as making foundation is concerned, I do not know that there is much difference. I do not suppose the white wax is really any better. Some of us like the look of it. It might be a harder and tougher wax, but it might not be so desirable for other reasons.

Mr. McEVOY: The bees will work the yellow wax the quicker, but for the brood chamber the white wax is preferable. I would give a third more for that wax.

Mr. CRAIG: When I was exhibiting I took pains to have a nice yellow wax, and I got third prize. I had the yellowest wax in the building.

Mr. HOLMES: The Ontario bee-keepers have certainly been very specially favored this evening. First of all we had a trip to that far-off southern land, Jamaica, and returned, without accident. We have been shown the advantages of bee-keeping in Canada, which is very satisfactory to us. Then we have had the pleasure of associating with our American cousins, who occupy a very warm place in our affections; and then further, the Minister of Agriculture deigns to grace this occasion with his presence. Certainly I think we have been highly favored. The Minister comes to us, and he exhorts us not to rest content. He tells us that we have not yet quite attained to the best. I believe it is a well recognized fact that the best in any line or department is only reached by development, and he assures us that we have the sympathy and the aid of his Department in going on and developing our specialty, until in combination with the great dairy industry in this Province we shall make this country virtually what it should be, a land flowing with milk and honey.

QUESTION DRAWER.

Q. Will bees move eggs?

Mr. Alpaugh: My opinion is that they will carry them from place to place. My reasons are these: I have had queen cells built and eggs put in them and queens raised where the queen could not get to lay an egg.

Q. Was it a genuine queen raised?

Mr. Alpaugh: These were genuine queens. I have had many a queen cell built on brood, but I am not speaking of those.

Q. What method does Mr. Hirschiser use in extracting wax from old combs?

Mr. Hirschiser: I will just explain to you the principle, and that is about as far as I can go. If you dip a sponge into ink, and then put on a pressure, that sponge will still be black. Any amount of squeezing will not take that black out, and if you put it in water you will squeeze it and get some more out of it. Just apply that principle in the extraction of wax. Of course there is a good deal more in it than I have told. The matter is in process of experimentation yet, and I do not think it is advisable to lead you off in the wrong direction. I am not quite satisfied myself yet.

Q. Please describe the points of a good smoker?

Mr. Alpaugh: Well, there are several. In the first place, you want a smoker that will work easy, and throw a good volume of smoke when it is wanted. You don't want one that is hanging back and the bees getting at you while you are making up smoke. You want one that is easily lighted, and one that will hold fire a good long time, and not in any way clumsy. Those are a few good points that I would consider. There are other good points, such as a smoker made out of brass, for instance, but the question of cost comes in there. We must have something that will last. Tin eats out, while brass does not. If properly made and properly taken care of, it should last for ten years. I may say there is another good point, that the sparks cannot get into the bellows; they are excluded by a fine wire gauze or screen. There are smokers made where the draft goes in above the fire.

Mr. Hirschiser: I find a weak point in some of them when you take off the nozzle a great many times it breaks off. I think that ought to be strengthened.

Q. What do you mean by being easily lighted? Do you mean some way without removing the nozzle?

Mr. Alpaugh: Yes; one I would like to have where you could light it from a lighted match from the bottom without dumping it out. But I have not been using such a smoker, because I like a fire grate in the bottom, and that prevents my lighting it from the bottom.

Q. What kind of a fire grate do you recommend?

Mr. Alpaugh: The fire rests on a little grate.

Mr. EVANS: I have two kinds. One is a loose fire grate that will come out, and the other is a piece of perforated tin or sheet iron. I think the first one is superior.

Mr. HOLTERMANN: I consider that to get a good smoker is money well spent. I think there is an objection in every smoker I know of at present; and that is, you want to get your grate so that it will stay where you put it. There should be some sort of a notch in the barrel, and a notch in the grate so that it will fit, and will stay there until you move it. There are some smokers that are constantly drawing sparks on to your hands and clothing, and that is a very serious defect. Another thing, you do not want a very wide barrel in proportion to the length of it.

Mr. MILLER: I think the smoker is better made wide, the opposite to what Mr. Holtermann says. When once it is filled you do not puff it into a flame the same as you do when the fire box is small and the flame concentrated.

Mr. HOLTERMANN: What is the size of your smoker?

Mr. MILLER: It is four inches by about eight and a half. The bellows is about 7x10 inches, as near as I could tell.

Mr. HOLTERMANN: We overcome that difficulty by moistening the material we use. If you do that it does not get to a flame. There is no necessity for giving it violent puffs.

Mr. SMITH: What fuel do you use, Mr. Holtermann?

Mr. HOLTERMANN: I use cedar bark, but in extracting time I use maple. I try to get the cedar bark as thick as possible. I am looking after a better smoker. Mr. Miller has a smoker, but I am afraid of it.

Mr. MILLER: It is nothing to be afraid of, I assure you. When you get a strong colony of bees it is a necessity. I have it so I can hold it between my knees. You have it in a handy place where you can use it without stooping.

Mr. ALPAUGH: I use planer shavings. They will give you three times as much smoke and less fire and heat.

Mr. MCEVOY: How many use the smokers without a veil? (Seven members hold up their hands.)

Q. Will a colony cast an after swarm with the last queen leaving the parent colony hopelessly queenless?

Mr. ALPAUGH: I would say yes once in a while, but not very frequently. I have had them do such a thing several times in my time. I have returned them four or five times with the young queen back into a colony, and they came out, and they had no queen left, and yet the queen would go out with the swarm. I put her back, and she would do that time after time. I do not know the reason.

Mr. TIMBERS: Did you find that queen to be a good one?

Mr. ALPAUGH: A good one, all right. The only reason I can give is that they must have decided to swarm, and you had interfered with their rules, and they carried out their own ideas regardless of what yours were.

Q. How best to keep pollen out of sections and hive on starters?

Mr. ALPAUGH: There is not much trouble in doing that. It does not say here how the sections are to be. If the sections are filled with foundation only then you will not have much trouble. But if you hive on starters and partly drawn sections above, I don't know how you would do it. It does not say here what is going to be used.

Mr. PETTIT: You have heard, I suppose, my advice. My method of keeping the pollen out of the sections is putting in one comb along with the starters, and using a queen excluder which I consider a factor along with the pollen catcher.

Mr. ALPAUGH: That is not hiving on starters.

Mr. PETTIT: It is the next thing to it

Mr. SIBBALD: In hiving on starters if you are going to put some sections that have been used the year before it is well to leave the bees on the foundation for twenty-four hours before you put the supers on. That gives them time to locate their brood nest. Then you put sections in, and you will not have very much trouble with pollen in them.

Q. If extracted honey is desired, are not drawn combs best to hive swarms on?

Mr. ALPAUGH: I would say certainly, if you have good combs to hive your swarms on. There is nothing better under the sun than good drawn combs for extracted honey. Hive on them every time if you have got them. If you have got combs all through so much the better.

Q. Can anyone cure an apiary of foul brood with formalin?

Mr. ALPAUGH: I have not tried it, therefore I am not in a position to answer.

Mr. SIBBALD: I spoke last year of formalin, but as there are some present to-night who were not here then, I may say that I tried formalin very thoroughly and it was not a success at all. The combs after being fumigated are not fit to use afterwards. The honey put in them will taste of it for years, and that alone is enough to condemn formalin.

Mr. LAING: I had a little experience along this line. I had three or four hives in Hamilton, and I thought I would try and find out something about it that might be of interest to bee-keepers. Out of the four so far as I can see it has failed. One of them is certainly cured, but the other three are not. However, I have not given the thing up as lost. I have repeated the experiment again on the colonies, and I will be able to tell you better a years from now what the result is.

Q. Is sugar syrup made by stirring sugar into cold water just as good to feed bees for winter stores as that brought to a boil?

Mr. ALPAUGH: I am not in a position to answer. I fed my bees in that way by stirring sugar in cold water, but I have not gone through a winter with it.

Mr. HALL: It is better than boiled, as it never granulates.

Mr. LAING: It is certainly less trouble. I have been feeding my bees from syrup made from cold water and sugar for at least a dozen years, and there is not any difference whatever so far as the results are concerned. You save a wonderful amount of mussing of your stove, and wearing out of your patience.

Mr. ALPAUGH: Whenever I have had any feeding to do I have always brought it to a boil, and if this is as good as the other I had a lot of unnecessary work.

Q. Is there danger of dark honey being carried from the brood nest to the sections?

Mr. ALPAUGH: I would say, yes, under certain conditions where there is lots of dark honey in the brood nest, and the queen has not yet taken full possession or development the brood nest as much as she will do and perhaps cannot until some of the dark honey is removed. They will make room for the queen if they have any other place to put the honey. So that I would say that there is a danger under certain conditions.

Mr. HOLTERMANN: I know that to be the case. I carried on some careful experiments with stocks that had buckwheat, and I watched them to see what the result was, and the buckwheat honey was carried up, and it was impossible for them to get it from any other source than from the brood chamber.

Q. Will a virgin queen introduced into a hive that has built the queen cells remain, the old queen having been removed previously.

Mr. Alpaugh: I do not know. I have had so little success in introducing virgin queens where I have taken out laying queens that I have practically given up the thing.

Mr. Holtermann: What if they are just pulled out of the cell and put in?

Mr. Alpaugh: Well, sometimes you can catch them that way. In that case they will accept the queen, but they will not swarm.

Q. Is it wise for a bee-keeper to give a full report of his crop, so that it will get into the hands of the dealers?

Mr. Alpaugh: I do not see any reason why he should not give a full report of his crop. I do not see why we should hold it back, trying to make out there is a poor crop. It might as well come out first as last.

Mr. Holtermann: That depends upon circumstances. I do not know whether that is intended for a little side hint on those that have done so or not. At the Ottawa Exhibition I met an old friend of mine, and he asked me, and I told him, and it got into the *Farmers' Advocate*. But if you will read that article, you will find it is very carefully worded. It was guarded, saying that I was in a section of the country where we had had a particularly good crop.

Mr. Timbers: It was information I was after. It seems to me that it makes the wholesale man both the buyer and seller to a certain extent. It gives the whole thing into his hands. He knows exactly how much there is and he can do what he likes with it.

Mr. Holtermann: We never want to misrepresent our crop, because if the buyer purchases under a misrepresentation and gives you a higher price, the next year he is going to sour on you, and will not give you so high a price. Give him the facts, and then let him use his judgment and you use yours.

Mr. Laing: You do not mean to say that you give them the exact figures?

Mr. Holtermann: I would not say that. My statement in the *Farmers' Advocate* was all hedged about. I do not think there is any harm in giving how much you have either.

Mr. Sibbald: The dealers will not buy honey up to its value until they are pretty certain about the crop. If you go to sell honey to a dealer, and he is very uncertain about the crop, he will offer you a low figure. He will say, perhaps, "I will give you six cents," but he is just taking that on specunlation, and he is bound to be on the right side. But after he has a good knowledge of the situation, he will go in with confidence and buy what honey he wants. I think it is better for the bee-keepers to be candid.

Q. Why is it that the majority of comb honey producers recommend the production of extracted honey?"

Mr. Alpaugh: I did not know they did, so that I am not in a position to answer. That is news to me.

Mr. Pettit: I do not know whether that is a hit at me or not. I have been a producer of comb honey, and have had a measure of success in producing a good article and a good quantity of comb honey; but I have told different ones that I am firmly resolved, that very shortly I will be through with comb honey.

Mr. Brown: I am contemplating producing some comb honey. All the bee-keepers said to me, "if you want to produce honey let it be extracted honey, and if you want comb honey, buy it."

COMMITTEES.

It was moved by Mr. **Holtermann**, seconded by Mr. **Emigh**, that the Honey Exchange Committee for last year be re-appointed. Carried.

It was moved by Mr. **Grosjean**, and seconded by Mr. **McEvoy**, that Messrs. Holtermann, Evans and Couse be the Transportation Committee for the coming year. Carried.

It was moved by Mr. **Emigh**, and seconded by Mr. **Byers**, that Messrs. Sibbald and Pettit be the Revising Committee for the coming year. Carried.

It was moved by Mr. **Darling**, and seconded by Mr. **Holmes**, that the Executive Committee be a committee to look after the interests of the Association in connection with the Fruit, Flower and Honey Show for the year 1906. Carried.

OUT APIARIES.

By Denis Nolan, Newton Robinson.

In dealing with this question it might be considered by a great many bee-keepers as one in which they had little interest as such a small percentage of those who keep bees ever manage out yards. However, I think if we look a little closer into the matter we will find that it is of more or less importance to all persons interested in bee-keeping.

Only in rare instances do we find persons who are fortunate enough to have a locality, a strain of bees or some superior system of management which enables them to keep a sufficient number of colonies in one yard to allow them to be classed as specialists in bee-keeping, or large producers of honey. Bee-keepers who are almost solely depending on their honey crop as their source of income are desirous that their crop be of such proportions as to furnish them ample funds for a comfortable living, find that under ordinary conditions such a quantity of honey cannot be procured in one apiary alone. By distributing our colonies in yards away from our home yard, we are enabled to allow our bees a much larger area to gather nectar from without having to travel great distances. By doing this we can keep a large number of colonies, devote all our time and study to this one work, be specialists in this particular line, always looking for better things in management, production and marketing of honey, etc. We are thus accomplishing for the bee-keeping world something which cannot be overlooked, besides turning into a sole occupation a profitable and pleasant work which in a great many instances is regarded as a mere side line.

From what I can learn by observation and otherwise, the fewer number of colonies kept in a given area the better results are secured. Taking this a basis, we will have to determine to our own satisfaction what is going to be the limit of the number of colonies kept in one yard according to our own management and locality.

Speaking on my own experience, I would suggest one hundred good colonies in the spring which might be increased to one hundred and fifty during the season. To increase these numbers would mean that you reduce the yield per colony, increase the desire to swarm, and have a larger amount of bees and brood to sustain on the nectar of the field covered. To reduce the number means to reduce the income on some investments, viz.: Cost of establishing yard, cost of maintaining yard, attendance, etc.

In establishing out apiaries, the first consideration should be locality. The area to be covered by the bees should furnish ample forage without traversing territory covered by bees from other yards, which would place it about three miles from any other large yard.

See that the territory has some honey and pollen yielding trees and shrubs for spring stimulating, as well as a full quota of basswood, clover, and perhaps a little buckwheat. A locality can best be judged after a practical tests of two seasons, as sometimes a half mile materially affects the yield secured.

Next locate the site for the yard, which is an all important matter. If possible choose a sheltered spot if bees are to be wintered there out doors, and have it shady if you desire trees. I prefer no live trees, but set out a half dozen tufty cedars by standing them in tiles set in the ground. You will see on your arrival in an instant if any swarms have clustered. One of our most satisfactory sites was in the centre of a pasture field about fifteen rods from the highway.

A good tight house, bee proof and dry, is a necessity, of course; but as out apiaries are not permanent institutions we can do very well with any means of shelter for our supers, empty hives, extracting outfit, etc., providing it sheds rain and protects from storms. A small tent can be made of cheap cotton to extract in if the building does not exclude robbers when this season arrives, for undoubtedly you will have considerable extracting to do after the main honey flow is over if you are an out-yard man. Another advantage the cotton tent has is that it gets very warm with the rays of the sun, and honey that is very thick can be easily extracted in cool weather. We like a good house at our out-yards where we can store our honey when it is extracted until we have time to remove it to the railway station. This saves handling, especially when you are busy; but if such is not available the honey can be taken home in sixty pound tins, as it is extracted, and can be strained from the extractor or after taking it home.

For wintering, if you do not wish to put your bees in cellars or repositories, they can be successfully wintered out doors, packed in suitable cases with four or six inches of good packing around the hives. Set the cases about eight inches above the ground, and protect the yard with a tight fence on the west and north sides six feet high to break the force of the wind and keep out the snow.

We now come to the most important question of all, managing the bees. In the fall and spring we find that the bee-keeper (aided by what he can prepare during the winter months) is quite capable of attending to several apiaries; but when it comes to the busy summer season when the bees swarm and gather honey, you will have to decide which plan of the many ways and means suits your individual tastes, your locality, and perhaps your hives.

Any plan that can be successfully applied to any yard can be applied to an out-yard. Only thoroughness is more essential in your work at the out-yard than at the home-yard, because the out-yard will be for a great part of the time without any attention, and many little things might get the benefit of your watchfulness at home that the out-yard will not receive.

The work must also be done systematically and seasonably, not putting off till to-morrow what you can do to-day.

Mr. Saunders: Mr. Nolan says he prefers a very shady place, and keeps the hives from the wind. Now, in my experience, I don't count very much on that at all. In fact, I think the wind sometimes is a little improvement, keeping the bees in when they should not go out. He spoke about using a tent. I do not use a tent. I use a good tight building, bee proof, and I find that suits me better than anything I have tried so far. Then, again, in storing the honey he uses a 60-pound can. I find that barrels suit me a great deal better.

Mr. McEvoy: Do you use these glucose barrels?

Mr. Saunders: Yes.

Mr. Byer: Do you wax the barrels?

Mr. Saunders: No, I do not need to wax them. I just fill them up and ship them in the same barrels.

Mr. Darling: You run it right into the barrels?

Mr. Saunders: I generally strain it into a tank, and then fill the barrels.

Mr. Byer: Do you always find the glucose barrels satisfactory?

Mr. Saunders: Well, in one case they wrote me that there was a hundred pound leakage, but after the honey had been left forty-eight hours at the station there wasn't a tablespoonful. There was one thing I neglected to say, and that is about the hoops. They should be driven on tight and nailed.

Mr. McEvoy: They should be stood on end. It will try the hoops if you roll them in.

Mr. Saunders: Sometimes they are jammed around and the hoops may give a little.

Mr. McEvoy: It is very important that they rest on the ends. If you do not do that the spring comes on the centre.

Mr. Deadman: On the shade question I notice these gentlemen differ somewhat. I was under the impression that it was not a good thing to have an apiary in a sheltered place. So far as wind goes, if your hives are facing east and the wind comes from the west, the bees do not get any discouragement. I had my apiary in an exposed position, and every year I had trouble getting the colonies up to the full strength, and when other people had supers on mine were delayed. I have them in a sheltered place now, and I find it much better. If the bees are facing east and the wind is from the west there is no hindrance there. I think Mr. Nolan is right.

Mr. Nolan: I hive them facing north-east.

Mr. Deadman: A friend of mine faces them north.

Mr. McEvoy: Mr. Nolan has one apiary that I would certainly want sheltered. That is the home apiary.

Mr. Nolan: What I meant by shelter was not by having them set just around a cluster of trees, but I want something in the nature of a woods, perhaps a quarter of a mile away. Now this yard is facing on the top of a hill, and the wind has a sweep on it and they do not do quite so well as they do down in the sheltered place.

Mr. Holtermann: I am satisfied that shade is a very important consideration in the prevention of swarming. I like to put them in an orchard where the morning or evening sun strikes them, but where they are sheltered in the heat of the day. I am thoroughly convinced it is an important consideration in the matter of swarming or not swarming. Someone said something about glucose barrels, and asked how to prevent leakage. I filled this year more than sixty of these glucose barrels, and they have been shipped, and there has been no leakage. One time I lost on one shipment $60, but I did not then know how to handle them. I may have my difficulties yet, but to begin with you want to buy good barrels. Do not buy barrels that the manufacturer has had standing outside where they have been rained on, and have been dried out, for the wood swells and breaks, and when it dries again the hoops are loose. If you get the barrels right and dry they don't need any paraffine at all. I run the honey directly into them, and then cork them up. I find that the honey you treat this way will remain liquid much longer than if you put in tanks first, and which is exposed to the air. I am satisfied we can run bees without swarming. I had twenty natural swarms this year, but you want abundance of entrances and plenty of super room. One is not enough. We have had three or four supers with twelve frames in, and you want plenty of ventilation in the supers. When you have not plenty of ventilation the bees are dependent on the air that comes through the brood chamber, and that gets foul, and makes them uneasy and sets up the swarming impulse; but when the air is fresh you can keep them contented. Now by having plenty of room in the supers you can keep down swarming to a very great extent, and that is one of the important things in our apiaries.

Q Do you find these barrels absorb a lot of honey?

The President: Perhaps I can tell you about that. I will tell you what they do in the confectioners'. Some of them use steam, and you can see how the inside would be left, and if you get that barrel right away it will leak, and you will have to drive down the hoops if you leave it in a shed or any place.

Mr. McEvoy: If they steam them they are not fit to put honey in, and they are not fit to put paraffine in. There are some barrels where quite a lot of the glucose has not been rendered out, and if you get them in that shape they are all right, but if they have been steamed out they are not. I remember about thirty years ago that I bought some oak barrels, and filled them with water to swell them, and in my ignorance I spoiled them. The honey drew it all out.

The President: There is another point in that. When they steam the barrels they melt out the paraffine that was put on by the manufacturers. If the glucose is taken out cold it makes a difference, because the original paraffine is right there, and they are as good as new.

Mr. Pettit: While we are on the subject of barrels, I may say that I had a little experience this summer with barrels that had been exposed to the weather. I found that after they dried it was impossible with some of them to drive the hoops down so as to bring the ends of the staves together, and I learned afterwards if I took a thin cold-chisel and a piece of hard twine and drove the twine into the crack and stopped it up, and then filled and plugged them, and then drove the hoops down, I could fix the barrels.

Mr. Byer: A dealer told me that he always got 25 to 40 pounds short in a barrel of honey, and I believe we should have some process of stopping this.

Mr. Chisholm: I had some experience last year in this. I took it out of a barrel that it had been in two years, to see how much the people would likely take off, and I was particular in weighing it, and it only ran short six pounds to what it weighed the year before. Of course I had it waxed over on the inside. I understand Mr. Byer had not in the case he told us of.

The President: There might have been some difference in the scales.

Mr. Holtermann: I would like to ask Mr. Saunders how he prevents swarming in out-apiaries?

Mr. Saunders: I cannot prevent it altogether. I start at home getting the supers and everything ready. My hives are with a large-sized top that will hold a sawdust cushion. In the spring, the first operation is to go over them and see that they have food and remove any dead bees that have collected. Then I crowd them up with the division board, leaving them, if they need it, a frame behind the division board with food so they will not starve for a couple of weeks. In looking over them I always make a practice of clipping the queens. To save time I always mark them, and when I go around I know whether the queen is clipped or not. Then the next visit I go around, giving them more room if they need it, and if there are some hives that are more full of bees than the next one, I commence to equalize them, getting them as equal as possible. In regard to the queens, I always have a few hives which I watch, and if they prepare to swarm, I take a frame with queen cells, and put the frame with the queen cell in the hives I intend to keep for increase. As the other hives commence to get strong and prepare to swarm, I watch them carefully to see if they commence to build queen cells, and if I see a sign of them starting at all I take three frames from them, replacing them with two foundation and one drawn comb in the centre, and I make use of those frames that I take from them in putting them into those hives I have started for increase.

The PRESIDENT: Do you destroy the other cells?

Mr. SAUNDERS: Usually. Now by taking three frames each from three hives I make an increase of one, and I usually can keep that hive down from swarming. I do not say altogether; I may have 25 or 30 per cent.

Mr. HOLTERMANN: Where do you put the foundation?

Mr. SAUNDERS: I have been putting in one drawn comb. I notice that the queens go right along and lay, and they fill the foundation also in the centre of the hive. The main thing is to get the queen laying. Once she stops laying and wants to swarm you might as well change them.

Mr. PETTIT: Do you put the comb in the centre of the hive?

Mr. SAUNDERS: Usually. When I take them in the fall I find those foundations in the centre are often three parts full of honey and it is a good thing.

Q. Do you find any trouble with the bees building queen cells while the queen is in another part?

Mr. SAUNDERS: Yes; I have that to contend with, but I make it a point to handle those frames and rake the queen cells off.

Mr. HOLTERMANN: There is a point that I admit I am very weak on. When the hive is in that condition, taking out the brood and putting in these combs or foundation, I do not succeed in having them filled with brood, and I do not want to divide up my brood chamber in that way.

Mr. DICKINSON: I would suggest that you take a frame out of a colony you want to hive with queen cells on.

Mr. HOLTERMANN: We do not want to divide them up.

Mr. PETTIT: We want to keep them all together in the hive without swarming. I have had fair success in putting foundation into the brood chamber, but I do not like to put in more than one sheet of foundation at a time.

The PRESIDENT: How often do you visit your yard?

Mr. PETTIT: Once a week.

Mr. HOLTERMANN: We are now dealing where the stock wants to swarm, and you want to prevent swarming. When they reach the condition when there is a likelihood of swarming, then I have to pursue radical means. I put a sheet of foundation in. If the supers are not crowded that may prevent it, but if they are crowded I have not been very successful.

Mr. CHRYSLER: I notice that people wait until the bees have the swarming impulse, and then they start to do something. Why cannot we do something before that time comes? Why wait until the disease gets started?

Mr. HOLTERMANN: We want to keep our bees together as long as we can and not do anything we do not need to do.

Mr. PETTIT: If plenty of room, ventilation and shade are given for taking extracted honey, we do not find more than twenty-five per cent. of them at the outside wanting to swarm. I use 12-frame Langstroth hives.

Mr. ALPAUGH: I may say that I had a lot of experience in trying to break up a brood nest in order to keep it from swarming, and I find that placing a sheet in the centre is one of the worst things you can do. It will cause it to swarm, as the queen seems to be shut off. When I want to break up the nest I find to keep the brood together is much better. If you want to add anything, do it outside. If you want to add anything in the centre, give clean old comb that the queen will accept at once. Next to that would be three or four starters. I find that the bees do not seem to want to swarm and leave the starters, but they will begin to build on the starters. It is very hard to say what is best to be done. But I wanted to ask Mr. Nolan if he finds from four to six inches of packing necessary?

Mr. Nolan: I think that perhaps four inches of packing would be enough, provided it is good packing, but perhaps some people might use four inches, and it would not be good packing. Sawdust is not very good packing. We use generally chaff. Planer shavings are good, but it is almost impossible to get them. I know nothing about leaves. With regard to swarming, the plan that I have tried to practice we found most satisfactory in some ways; that is to remove the brood from the brood nest when we found the colony is preparing to swarm. I do not think it is necessary to take medicine until you are sick, and we do not care to divide a colony until we find they are preparing to swarm. Give them lots of super room, and keep them cool. If you cannot do any better, keep the covers up, and give them ventilation that way. When you find they have begun to build queen cells, that is the time to treat them by removing some of the brood. I prefer removing the brood in the larval stages. It is not the brood that is in the larval stage that is going to get the honey. If you have them put drawn combs in the brood chamber, but full sheets work very satisfactorily. I think it is better to put them in between the combs. Put them towards the centre, because if you place the brood at the outside the queen is more likely to lay in them, and they are less likely to place honey in the centre of the hives than at the outsides.

A Member: How does Mr. Holtermann ventilate his supers?

Mr. Holtermann: In the back of the hive. I have had up to this year a piece of tin on either side just to slip it backward and forward. It is very important to have ventilators in the supers in order to prevent swarming. I will tell you the way I think our stocks operate. We know that as they come up to full strength in the brood chamber it is not a time to put on supers. Instead of giving them to the weak stock, I would give them to the next strongest, and in that way equalize without any loss of honey gathering bees, because in an 11-frame or 10-frame hive there is a honey gathering force. When you have filled them you have lost nothing of your honey gathering force: and go on in that way until you have got them all filled up. That is the way I get my increase. I try to have laying queens ready. I leave a nucleus, and the young bees will adhere to these, and I would build up full stocks again. I try to build up in that way, and keep all my honey force ready for honey gathering, and in this way I think we get good results.

Mr. Byer: What I had to say was much along the line of Mr. Holtermann's remarks. In Mr. Nolan's paper it was mentioned about equalizing stocks on the second visit. In my experience I find that a dangerous practice. I find it far better to leave the colonies intact as much as possible. If I have an extremely strong colony it is an excellent thing, but it is a lot of work. I have been in the habit of adding an extra story, but if I used a single hive I would put it underneath, and I would allow the queen the full run of those combs. I build up my colonies at the beginning of the flow, so that I have my honey bees ready when the flow comes on. If the weather turns cold there will be some chilled brood.

Mr. Holtermann: That is a strong point. In building up your next strongest colony you run no danger.

Mr. Byer: Don't you find a danger of having a strong colony swarm right in the honey time?

Mr. Holtermann: Not if you take them in time.

Mr. Hirschiser: A number of years ago—I think it was at a meeting of the Canadian Bee-keepers—I advocated something like Mr. Holtermann says, but a good many of the old bee-keepers thought that was not a good plan. They thought it was better to equalize by giving to the weaker colonies.

Mr. Holtermann: I do not claim these are my own ideas; I pick up a thought here and a thought there.

Mr. Hirschiser: There is one point that Mr. Holtermann did not bring out, and that was in building up the medium colonies instead of the weakest. Supposing you have a good queen in a weak colony, and the season comes along and there is not enough bees in there to take care of the brood that queen naturally produces. In that case we actually gain in the apiary by taking a frame from that weak colony and taking it to a strong colony that can take care of it, and it leaves that colony we have taken that frame from in better condition. I find I can build up an apiary in bad condition by taking from the very weak and building up the medium, because we give that good queen in the weak colony a much better opportunity.

Mr. Saunders: What do you mean by sufficient super room?

Mr. Holtermann: Well, there is a point that I see in the prevention of swarming. A queen will lay and there is a certain amount of increase going on, and if you have a limited worker force in proportion to your brood chamber, then the worker bees are not dying off nearly as rapidly as the increase is going on; but as you increase your worker force the proportion of dying bees is greater than with the more limited brood chamber, and you can get that condition where your brood is going on at a certain rate, and if the two balance one another as nearly as possible you can then control the swarming to a certain extent.

Mr. Saunders: How much does each super hold in honey?

Mr. Hirschiser: About 80 pounds.

Mr. Holtermann: We do not extract till the close of the honey season, as in that way you do not give the bees the same violent stop as you do by taking out the honey every now and then.

Mr. Dickinson: I take no honey when the honey season is on except from the second super, and I endeavor to take that off when it is ripe.

Mr. Armstrong: I think that is a good point that has been brought out. I have tried that myself. I used to think that just as soon as a super is ready off it must come, but that disturbs my colony of bees, and it does not do the work it should. If you place a super with no honey in it, it does not disturb them, and you do not stop the working force at all.

Mr. Lowey: I like to leave the honey just as long as possible for the sake of the honey. Even comb honey I favor leaving it as long as possible, even if it gets a shade darker. It is a better flavor. I have taken it off when it was snow white when it had a black spot in the middle; but I think that is the fault of the frames at the bottom.

Mr. Whiteside: It seems to me there could be some convenient way of diagnosing a hive that would save a lot of trouble. We must go over 60 to 100 hives a day, and if we raise the cover on one and see cups, and raise another and see them there, that should be all we would need to see. If we could get in a way of diagnosing a yard, and looking at one or two it would save a lazy fellow like me a lot of trouble. I think we can tell pretty near the condition of a hive by looking at one or two combs.

Mr. **Holtermann**: If you have one spot that is near the centre of the brood chamber, and you look at that spot that brood is all right, but in an ordinary hive where you simply look on one or two combs, I find it is a mistake.

Mr. **Bowen**: Controlling swarming in comb honey and extracted honey are entirely different things. I run only a small proportion of my apiary for extracted honey, perhaps ten or fifteen per cent, of the number of colonies. I was under the impression that you extracted honey men had no swarms. I had a good crop. My average comb and extracted was between 90 and 100 pounds per colony, and four-fifths of that or more was comb honey. I ran some of my best colonies for extracted honey this year, and they did not swarm. I built them up four supers, using an 8-frame Langstroth, and these hives would be full of bees, but there would be no swarming. Some of them are pretty nearly pure Italian, but most of them are a cross, hybrids, with a greater percentage of Italian blood. But for comb honey I do not know how to prevent swarming. I can not do it unless I divide them up artificially. That is the only way. I do not do anything particularly. I have a large entrance, and I give no ventilation in the back at all, neither top ventilation nor back ventilation. My apiary stands in an orchard under large apple trees. The greater proportion are under apple trees, but some I left for extracted honey are in the sun. The flow ran about five weeks this year, but it does not do that always.

Mr. **Holtermann**: You have a fine locality.

The **President**: Is there much time between the fruit and the clover that there is no honey coming in?

Mr. **Bowen**: Usually about two weeks. After the bloom there is nothing but the clover.

The **President**: If the fruit bloom drags along till the clover then they are pretty hard to control.

Mr. **Bowen**: This year there was just time enough between the fruit bloom and the clover flow for them to use all the honey they had in the hive. In fact I was contemplating feeding.

Mr. **Hall**: That explains the situation.

Mr. **Dickenson**: Don't you think there is a great deal in the race of bees. I have never had an Italian stock swarm with extracted honey, but with the Carniolans and the blacks it might be different.

BEES AND FERTILIZATION OF BLOSSOMS.

Moved by R. F. **Holtermann**, and seconded by **Martin Emigh**, "That this Association would respectfully solicit the Hon. Nelson Monteith, Minister of Agriculture for Ontario, to have the proper officers of the Department of Agriculture conduct a series of experiments, with the object of securing evidence as to the value or otherwise of bees, acting as agents in the fertilization of blossoms such as fruit-bloom, alsike, clover, and buckwheat. with the object of arriving at the value or detriment of these visits by the bees in increased or decreased value of the crops. That this and other testimony of value upon the subject be published in the form of a bulletin, and every other available means, and that a special invitation be publicly extended to any one who has evidence that bees injure crops by gathering nectar from blossoms, and that such evidence, if any, be also published through the above channels. Carried.

I am sure there is a great difference of opinion on this subject, as I suppose the majority of you know. There are those who actually think that the bees are an injury to alsike clover fields and the buckwheat field. This is to get before the Ontario farmers evidence in that direction, and it also puts the quietus upon them by asking for evidence from these men, and they cannot say you only present one side.

Mr. ROBINSON: There is a man in our neighborhood, and he is supposed to have the most brains of any one around there, and he says the bees just suck the very heart out of the alsike clover.

Mr. LOWEY: I grow some alsike clover, and I spoke to a man who owned a threshing machine, and told him I thought I would thresh it. "Oh," he said, "there isn't any seed in alsike this year." Well, I told him there would be in my case, as I had bees. And when they came to thresh it they were surprised at the amount of seed I got out of it.

The PRESIDENT put the motion, which was carried.

Mr. HOLTERMANN: I have another resolution here with regard to spraying. Instead of a fruit grower spraying himself it appears they have machines now, and the men with these machines go through a section spraying, and it is getting dangerous. The temptation it to spray through the fruit bloom and after. I know a gentleman who through having his bees depleted by poisoning had his honey crop very much injured, and I would like him to speak. The idea in this resolution is that we will offer a reward for the next conviction of anyone found disobeying the law in this respect. It is moved by myself, seconded by Mr. Pettit.

REWARD FOR CONVICTION OF ILLEGAL SPRAYING.

Moved by R. F. HOLTERMANN, seconded by MORLEY PETTIT, "That this Convention would recommend that the directors of the Ontario Beekeepers' Association offer a reward of twenty-five dollars for the next conviction of any one illegally spraying during the time that fruit trees are in blossom." Carried.

Mr. BEAUPRE: When the fruit bloom set in I had some colonies, and they were very strong, and after the fruit bloom was done I had a little bunch of bees you could hold in your hand in the corner of the hive. When the clover honey started we put supers on, and they built up and we got nearly half a ton of honey afterwards. I know it was the spraying did it, although I could not find the guilty party.

Mr. WOOD: I got a man convicted three years ago for spraying. The year before that I lost nearly my whole crop of honey. I summonsed two men. I lost the first case, but in the second case I got a conviction, and it did a lot of good in my neighborhood.

Mr. LOWEY: I had some good strong colonies, and about fruit bloom I found a lot of them dead, and I was thoroughly convinced it was the spraying. One of my neighbors could get the sprayer in the bloom, and I went to him when he was spraying, and I said, "Don't you know it is against the law to spray the trees while they are in bloom?" Then I mentioned bees and talked to him, and he got a little mad, so I pulled him up. The magistrate saw me about it, and he said the man was pretty well frightened, so I agreed to stop it, and paid the costs myself, but I have had no trouble since. I am very much in favor of that resolution.

Mr. HALL: I went out in the yard with the lawn mower, and I found my bees hopping around like grasshoppers. My home apiary was very much affected, and I came to the conclusion it was the spraying. I found that a lawyer who lived near me, and who had a very nice place had been spraying, and was going to spray the next day, so I went to him and told him he must not do it, and he was very much surprised when I told him it was against the law. But he did not spray his trees.

Mr. Grosjean: Would it not be of benefit to have an addition to that resolution? There are some trees that come into bloom after the others, and a man might go into the orchard after the bloom was off the others and spray the other ones which were late as well.

The President: This is just a reward for the next conviction for illegal spraying.

Mr. McEvoy: When that matter was up before the government the fruit growers raised a cry that their interests were in danger, and the lawyers put that in to have no spraying while in full bloom, and that is the weakest part in the act.

The President put the motion, which was carried.

Mr. Couse: I take very much pleasure in moving a vote of thanks to those who have helped to make these meetings interesting. There is the Hon. Mr. Monteith, Minister of Agriculture, Prof. Harrison, and Mr. Shutt, Mr. Hirschiser, Mr. Hutchinson, and our own members who gave addresses. I might say in getting up the programme it was a very easy matter. I think everyone that I asked agreed without any trouble at all. That made it very easy for your committee, and I think as a consequence all the meetings have been interesting and profitable. Those who have helped to make it so deserve the thanks of this Association. I take very much pleasure in moving this vote of thanks.

Mr. Craig: I have very much pleasure in seconding the motion made by the Secretary. I think we have had a very pleasant and profitable Convention, probably the best we have ever had.

The President put the motion, which was carried with applause.

The Convention then adjourned to meet next year.

APPENDIX.

AN ACT FOR THE SUPPRESSION OF FOUL BROOD AMONG BEES.

6 Edward VII., 1906.

His Majesty, by and with the advice and consent of the Legislative Assembly of the Province of Ontario, enacts as follows:

1. This Act may be known as "The Foul Brood Act."

2. The Lieutenant-Governor in Council upon the recommendation of the Minister of Agriculture may from time to time appoint one or more Inspectors of Apiaries to enforce this Act, and the Inspector shall, if so required, produce the certificate of his appointment on entering upon any premises in the discharge of his duties. And the Minister shall instruct and control each Inspector in the carrying out of the provisions of this Act. The remuneration to be paid to any Inspector under this Act shall be determined by order of the Lieutenant-Governor in Council.

3. The Inspector shall, whenever so directed by the Minister of Agriculture, visit without unnecessary delay any locality in the Province of Ontario and there examine any apiary or apiaries to which the said Minister may direct him, and ascertain whether or not the disease known as "foul brood" exists in such apiary or apiaries, and wherever the said Inspector is satisfied of the existence of foul brood in its virulent or malignant type, it shall be the duty of the Inspector to order all colonies so affected, together with the hives occupied by them, and the contents of such hives, and all tainted appurtenances that cannot be disinfected, to be immediately destroyed by fire under the personal direction and superintendence of the said Inspector; but where the Inspector, who shall be the sole judge thereof, is satisfied that the disease exists, but only in milder types and in its incipient stages, and is being or may be treated successfully, and the Inspector has reason to believe that it may be entirely cured, then the Inspector may, in his discretion, omit to destroy or order the destruction of the colonies and hives in which the disease exists. 53 V., c. 66, s. 3.

4. The Inspector shall have full power, in his discretion, to order any owner or possessor of bees dwelling in box-hives, in apiaries where the disease exists (being mere boxes without frames), to transfer such bees to movable frame hives within a specified time, and in default of such transfer, the Inspector may destroy, or order the destruction of, such box hives and the bees dwelling therein. 53 V., c. 66, s. 4.

5. Any owner or possessor of diseased colonies of bees, or of any infected appliances for bee-keeping, who knowingly sells or barters or gives away such diseased colonies or infected appliances, shall on conviction thereof, before any Justice of the Peace, be liable to a fine of not less than $50 or more than $100, or to imprisonment for any term not exceeding two months. 53 V., c. 66, s. 5.

6. Any person whose bees have been destroyed or treated for foul brood, who sells or offers for sale any bees, hives or appurtenances of any kind, after such destruction or treatment, and before being authorized by the Inspector so to do, or who exposes in his bee-yard, or elsewhere, any infected comb, honey, or other infected thing, or conceals the fact that said disease exists among his bees, shall, on conviction before a Justice of the Peace, be liable to a fine of not less than $20 and not more than $50, or to imprisonment for a term not exceeding two months, and not less than one month. 53 V., c. 66, s. 6.

7. Any owner or possessor of bees who refuses to allow the Inspector to freely examine said bees, or the premises in which they are kept, or who refuses to destroy the infected bees and appurtenances, or to permit them to be destroyed when so directed by the Inspector, may, on the complaint of the Inspector, be summoned before a Justice of the Peace, and, on conviction, shall be liable to a fine of not less than $25 and not more than $50 for the first offence, and not less than $50 and not more than $100 for the second and any subsequent offence, and the said Justice of the Peace shall make an order directing the said owner and possessor forthwith to carry out the directions of the Inspector. 53 V., c. 66, s. 7.

8. Where an owner or possessor of bees disobeys the directions of the said Inspector, or offers resistance to, or obstructs the said Inspector, a Justice of the Peace may, upon the complaint of the said Inspector, cause a sufficient number of special constables to be sworn in, and such special constables shall, under the directions of the Inspector, proceed to the premises of such owner or possessor and assist the Inspector to seize all the diseased colonies and infected appurtenances and burn them forthwith, and if necessary the said Inspector or constables may arrest the said owner or possessor and bring him before a Justice of the Peace to be dealt with according to the provisions of the preceding section of this Act. 53 V., c. 66, s. 8.

9. Before proceeding against any person before a Justice of the Peace, the said Inspector shall read over to such person the provisions of this Act or shall cause a copy thereof to be delivered to such person. 53 V., c. 66, s. 9.

10. Every beekeeper or other person who is aware of the existence of foul brood, either in his own apiary or elsewhere, shall immediately notify the Minister of the existence of such disease, and in default of so doing shall on summary conviction before a Justice of the Peace be liable to a fine of $5 and costs. 53 V., c. 66, s. 10.

11. Each Inspector shall report to the Minister as to the inspection of any apiary in such form and manner as the Minister may direct, and all reports shall be filed in the Department of Agriculture, and shall be made public as the Minister my direct or upon order of the Legislative Assembly.

12. Chapter 283 of the Revised Statutes or Ontario, 1897, intituled An Act for the Suppression of Foul Brood among Bees, is repealed.

FIRST ANNUAL REPORT

OF THE

POULTRY INSTITUTE

OF THE

PROVINCE OF ONTARIO

1905.

(Published by the Ontario Department of Agriculture, Toronto.)

PRINTED BY ORDER OF
THE LEGISLATIVE ASSEMBLY OF ONTARIO

TORONTO:
Printed by L. K. CAMERON, Printer to the King's Most Excellent Majesty,
1906.

WARWICK BRO'S & RUTTER, Limited, Printers
TORONTO

To the Honourable WILLIAM MORTIMER CLARK, K.C., *Lieutenant-Governor of the Province of Ontario.*

MAY IT PLEASE YOUR HONOUR:

The undersigned begs to present herewith for the consideration of His Honour the Report of the Poultry Institute for 1905.

Respectfully submitted,

NELSON MONTEITH,

TORONTO, 1906.
Minister of Agriculture.

POULTRY INSTITUTE OF ONTARIO.

1905.

To the HON. NELSON MONTEITH,
Minister of Agriculture for the Province of Ontario.

SIR,—I have the honor herewith to present to you the report of the first Poultry Institute held at the Ontario Agricultural College. This meeting was called at the request of the poultrymen throughout the country, who responded in large numbers and remained in attendance until the meeting closed. The Hon. Minister of Agriculture for the Dominion of Canada sent to us his Poultry Experimenters from the different parts of Ontario and Quebec; the 30 men who had been taking our Short Course in Poultry Raising had just completed their session, and remained over for the Convention; a number of men and women who had taken the Poultry Course in previous years came back for the Institute; and in all, more than 100 persons attended each session, most of whom took part in the discussions. We believe that the report of this first Institute will make valuable reading for the farmers of Ontario who are in any way interested in the poultry business, and we recommend that it be published. All of which is respectfully submitted.

I have the honor to be, Sir,
Your obedient servant,
G. C. CREELMAN,
President.

GUELPH, March 1st, 1906.

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POULTRY INSTITUTE.

The first annual meeting of the Poultry Institute of Ontario was held at the Agricultural College, Guelph, on the 6th, 7th, 8th and 9th of March, 1906.

When Mr. W. R. Graham, Manager of the Poultry Department of the Ontario Agricultural College, opened the first meeting of the Institute, every seat in the Lecture Room of the Poultry Department was occupied.

On motion, L. H. Baldwin, Deer Park, Toronto, was elected to the chair, and occupied the position throughout the subsequent proceedings.

The Chairman: I am sure I deem it an honor to be asked to act as Chairman of the first meeting of the Poultry Institute. I think we will get a great many practical results from the meeting. I am going to ask Mr. A. J. Hunter, an expert from the other side of the line, to speak to us on "Dry Feeding." I do not think I need say much in introducing Mr. Hunter, because we all know him from what he has written in the poultry papers.

DRY-FEEDING: THE NEW POULTRY CULTURE.

By A. F. Hunter, West Roxbury, Mass.

For many years past there has been a growing dissatisfaction with both the methods employed and the results attained in our poultry work. The methods employed have involved an excess of labor and the results attained have been, in far too many cases, disappointing; the disappointments taking the form of poor health of the flocks of both mature birds and young chicks, resulting in a lowered egg-yield, increased mortality, diminishing profits, and in very many cases an abandoning of the poultry business. That there may be many contributing causes to the unsatisfactory results has been conceded by poultry writers, among them unsanitary conditions in the houses and ground of yards poisoned by the droppings, vermin infestation, stock debilitated by inbreeding and breeding from late hatched and consequently immature pullets and cockerels, bungling methods of feeding, shutting the birds up in tight houses, etc. Any or all of these may have helped to the unsatisfactory results above noted.

In the last few years observing poultrymen have been experimenting along two different paths, in the hope of finding aids to better results: one of these paths being to more and more open up the houses to fresh air and sunlight, the other being a better and more common-sense method of feeding. The first of these we have not time to study in detail, merely pausing to observe that it is a decided gain in method, and substantially improves the conditions of health in the flocks: the second, that of feeding, gives us all the range we have time for to-day.

That quite a good deal of the trouble we have been having with our flocks was due to defects in methods of feeding has come to be the opinion of many observers, and of late the feeling has been gaining ground that the feeding of a cooked mash is a serious mistake. One reason for this is found in the fact that the fowls gobble the food down very quickly, far too quickly for the digestive organs to properly perform their allotted task, and the results have appeared in the form of indigestion, looseness of the bowels, and other symptoms of the birds being out-of-condition. Not infrequently the birds become over-fat, the organs become engorged, a blood vessel bursts, and the fowl is found dead under the roost in the morning. The explanation of this is that feeding a cooked mash is 'forcing'' the birds beyond their ability to digest and assimilate; it is analagous to ''forcing'' for rapid growth of tender, delicate flesh for market, and the process is all right for chickens that are to be killed early for the table; for that definite purpose the quicker the growth the greater the profit, but for birds that are to endure the strain of persistent egg-production, and are to be the parents of strong, vigorous, bound-to-live offspring, the ''forcing'' process invites disaster, because it induces and continues a condition of tenderness, which is exactly opposite from the hardiness so desirable for the best results.

The conviction that feeding a cooked (or wet) mash is a mistake is well illustrated in the statement of a poultryman, writing in one of the poultry papers, who says:—''When I want to force the birds to heavy egg-production I feed a cooked mash, but when I want to get good, strong-bodied eggs, eggs that will hatch out a large proportion of strong, vigorous chicks, I feed the breeding pens a dry-mash and all dry grain,—and I get eggs that will hatch!'' There is a clear statement of the conviction that mash-feeding is a mistake if we want the limit of strength and vigor, and who does not? It is clear that not only the best of health and strength is desired by all who want the best profit from their flocks, and it is being demonstrated by experiment that the best and most continuous egg-yield is gotten by a radical departure from the cooked-mash method of feeding, and adopting the method suggested by our friend quoted above, of feeding the mash dry and supplementing it with the usual feeds of dry grains and seeds.

A farmer in Illinois tells his experience in feeding, and how he came to adopt the dry-feeding method, he says: ''After reading much upon the subject, I concluded the greater part was nonsense, and I now fully believe that inside the next ten years feeding poultry in every stage will be much simplified. I have had some experience in growing hogs, and did considerable experimenting with feeding. I found that by using ground, mixed grain, fed dry, I could grow a prettier, more shapely and firmer fleshed hog, than by feeding a slop.

''Nothing under the sun fed in its natural state will blow up a pig to such an extent as a rich slop, and no pig so fed will have the fine symmetrical appearance of one that is fed more in accordance with nature. I fully believe the slop-feeding is destructive of the digestive organs of the pigs, and also fully believe the mash business for chickens and hens gives the same unfortunate result. Any mash will begin to sour soon after being eaten and subjected to the heat of the body, and this too early souring of the food in the crop, before it is properly passed on to the gizzard and intestines, is the foundation of sour-crop and bowel trouble. I will guarantee you that if cracked or whole grain is given regularly (and not in spurts now and then), examination of the crop at any time will not reveal that sour smell so frequently noticed in mash-fed hens.

''When dry-fed a chick will not gulp down a great amount of the food at one time, and I fully believe that with dry-feed moistened with saliva it will not sour nearly so quickly as if it is moistened with hot water or milk. If my method of feeding will grow good, healthy Plymouth Rock pullets to weigh 7½ to 8½ pounds in seven or eight months, I believe that pullet is in better shape to lay, and, if continued on dry-food, will at two years of age lay as many or more eggs than will a mash-fed chick and hen; and not only this, but the eggs will be larger and more fertile, and when you come to sell the carcass it will have both a better appearance and better weight. I know the eggs I am getting now are better in size, color and shell than any I ever bought; I mean 35 to 50 per cent. better in quality, and this I attribute to my having adopted the dry-feeding method. I am certain that dry food properly fed means health, with no sour-crop and no bowel trouble.

"When I began dry-feeding I had never seen an article upon the subject. I knew I could do better with hogs on dry food, but had never studied why. I knew I had too much to do, was too busy with the farm work to grow chickens with mashes. I planned my year's campaign before a chick was hatched, that is, the best of grain, sweet milk before the chicks all the time, beef scraps also, and charcoal accessible all the time, with clover hay chaff for litter, and good range. I have experimented with dry feed for chicks for two years, the past year for all ages of poultry, with the best of success."

Here is another writer's argument: "Well-bred chicks are naturally hardy. Chicks born of strong, hardy parents, come into the world about as well fitted for the battle of life as anything we know of. Given half an opportunity, fed within the bounds of reason and common sense, and properly brooded, it seems almost impossible to kill them. They have an ample coat of down which protects them from almost all kinds of weather for short periods. Given a well regulated brooder they will cheerily run out into an almost zero temperature, and apparently be as happy and contented as though it was warm summer weather,—and they certainly grow much better than when placed in what some call better conditions. Fed improperly, or kept at too warm a temperature, or when they are so unfortunate as to have had weak parents on one or both sides, the reverse conditions seem to be the result,—they are about as delicate, puny and unsatisfactory atoms of mortality as the world produces.

"By closely studying nature's methods with chicks we find that the mother hen, leaving the nest when the chicks are from one to two days old, does not have a chance to lead the way to a dough dish and fill them up with an indigestible mess of dough. On the contrary, she starts out on a hunt, and, if she is undisturbed, she makes a good display by nightfall, and has succeeded in filling the crops of her numerous family. If we could dissect those crops we would not find a scientifically prepared mixture of one to four, or one to five, or "sixteen to one;" or any other startling array of chemical combinations. Instead, we would find a bug or two, a worm, some seeds that we may have carefully planted in the garden a day of two ago, together with a variety of weed seeds, and plenty of grit. This composite mass has been gathered together in ten or twelve hours' time, with a liberal sprinkling of exercise thrown in, and if the weather conditions are favorable and the mother hen does not drag the youngsters around through the wet grass too much in the morning, she usually comes out at the end of the season with as many full sized chickens as she started from the nest with.

"Your mash-fed chicken gets up in the morning, waits around an hour or two until the feeder gets ready to bring along a bucket of hot or cold mash, which is thrown down on a board or trough and a wild scramble begins. Each one gulps down what he can reach; the weaker get a little and the stronger get the bulk of the food. If the mash is hot it raises the temperature of the birds above the normal, perspiration is started, and this opening of the pores of the skin paves the way for a chill, and the foundation of colds and roup is laid. The food goes through the crop with very little change except fermentation, and the extra work of preparing the food for digestion is thrown upon the gizzard and intestines, whereas the saliva of the mouth and kneeding of the crop should have done quite a little towards softening and partly digesting it.

"But, it is objected, the fowls won't eat it! This is true. They will not eat the dry mash for a day or two, when they have been brought up on the wet mash ration, but brought up on a dry mash they eat it freely and whenever the appetite prompts, and it never stands before them sour,—the last spoonful in the hopper is as sweet as the first.

"Furthermore, each bird gets its full share. There is no wild scramble for the heaps of wet mash in the trough. A bird goes to the food-hopper and eats two or three mouthfuls of the dry mash, taking time to turn over and properly moisten it with saliva, and then turns away to search for other bits, as a seed or two, or a grain of wheat, or oats, or barley, or kernel of corn; there being no frantic scramble for the feed-hopper there is ample time for each bird to help herself to all she wants, and they all get their full share.

"The pith of the argument for dry feeding lies in that eating, slowly, a bit at a time: first a mouthful of dry mash, then a bit of grain, or a seed or two, and then a snip at a clover leaf or head, then to the drinking fountain for a sip of water. It does not take us long to discover that this is exactly the way the fowl or chick eats when running wild and finding its food bit by bit. It is nature's way for a bird to feed, and if we but do our part in supplying the essential food elements so that the birds can take what they want and as they want it, the conditions seem to be right for them to eat in the natural way, and they will eat no more than they want and eat it in the way their systems can best appropriate it."

Dr. Nottage, of Goshen, Mass., who is a sturdy advocate of the dry-feeding method, says:—"To better understand the advantages of dry-feeding, let us look at the method I employ in using the grains. The fact that I have got rid of mixing and cooking mashes, and am now feeding most of the grain and for the greater part of the time from feed-hoppers, shows how much easier it is to care for a good sized flock of fowls. The advantages are apparent to all who feed their flocks four or five times a day, and are constantly fussing with them. I have come to be spoken of by the farmers around here as 'the man who feeds his hens twice a week,' from the fact that during the growing period, from the incubator to the pullet that is about beginning to lay, I feed all the grain and beef scraps from feed-hoppers which I fill twice a week. Keep in mind that all young stock is on free range, and the laying birds in yards so ample they seldom wander to the ends of them: also, that this laying stock is let out to wander at will on alternate days.

"Have plenty of grit where the chicks can pick it up for their first meal. Get your miller to mix together one part of good sound wheat to two parts of sound corn and crack them a little finer than common cracked corn. Put a small heap of this in the front of the brooder, and beside it a small heap of dried beef scraps, from which the coarser pieces have been sifted out: this sifting out of the coarse pieces to continue till the chicks are big enough to eat the scraps as they come to hand. If you have skimmed milk keep the youngsters on that for a drink until they become a little tired of it, which may be in two or three weeks; you can then let them have their choice between milk and water. If there is not a green sod for them to pull and work at when they get into their second week, chop up some onions, or lettuce, or cabbage, and let them have some once a day. Get them out on the ground as soon as there is a blade of green grass to be seen pushing up through the sod.''

You can carry the birds along on a ration of half wheat and half cracked corn, with the beef scraps added, until the pullets are about half grown, say ten or twelve weeks old; when the grain ration is gradually changed by the introduction of the best grade of oats till in a couple of weeks it will be a fourth oats, a fourth wheat and half cracked corn, and on this ration they are left to grow to full maturity. The addition of oats to the hoppers is to strengthen the body-building side of the ration, oats being the best body-builder of all the grains. In this simple way it is possible to grow good, strong, healthy layers, and not have one bit of fuss about "balanced rations'' and forty different kinds of food. When the pullets show signs of getting ready to lay, which they will do by October first if they are hatched in April, it is high time to get them into the quarters they will occupy during the winter, and it is now time to change the manner of feeding somewhat.

The food for the laying hens is in a food-hopper which is divided into three compartments, each holding about half a bushel; in one compartment is a mixture of one-half barley and a half cracked corn, in the middle compartment is the beef scraps and in the other whole oats. This food is there in the hoppers all the time, the hoppers being refilled twice a week, and never being empty, and they eat of either or all of them just as they choose. It is evident that if the hoppers were sufficiently large to hold a full week's supply of grain they would only need to be filled once a week, and then the Doctor would have it told of him that he only fed his hens once a week!

The question of green food supply, here in our rigorous climate where snow covers the ground for many weeks and some winters as much as four months, is a most important one, and the question is frequently raised as to feeding something warm, "to warm up the birds when they come off the roosts.'' If one has the feeling that he must feed something warm, by all means make it a feed of steamed clover, cut in half-inch lengths, and the green food supply will be covered at the same time. The freshening of cut clover by either steam or hot water makes it more palatable, makes it considerably like new-mown hay before it is cured, and the fowls relish it greatly. They also relish the cut clover dry, and some progressive poultrymen keep a wire netting pocket of cut clover hanging against the wall of each pen, the clover being cut in half-inch lengths and a half bushel at a time put in the pocket. The fowls eat a good deal of it. The usual green foods, such as beets, turnips, carrots, cabbages,—any of the vegetables commonly used for this purpose, can be fed just the same when the grains are fed in hoppers as when the old-time mash breakfast was fed.

Another prominent poultryman's method of dry-feeding he describes as to give the chicks a mixture of assorted grains, and grit of about the size of a pin head, for their first food. With a dish of beef scraps standing constantly before them, and the fine-ground food thrown in litter, with plenty of green food (cabbage and green grass), they have an inducement to scratch from sunrise to sunset, and they take the food slowly and naturally. With the beef scraps always within reach they at no time crave more animal food, their systems rapidly adapt themselves to a season of plenty, and nature constructs a body planned for a continuation of this same diet, namely: good, thick strong leg and frame, and a chicken that looks ready to eat at any stage of the game!—long-bodied, short-legged, hardy, "born-to-live" looking fellows, free from all the ills and pains of chickendom, and fit to wrestle for a living through thick and thin, through good weather and bad, so long as the food holds out.

When they reach the age of six or eight weeks we gradually wean them from the small grains and substitute cracked corn and wheat, place then in colony coops on grass range, and soon discontinue the wheat, feeding cracked corn and beef scraps in hoppers, feeding once a week or oftener as the size of the hopper and number of chicks demand. These food-hoppers should be made quite high in front, three inches at least, as the birds are always trying for the larger pieces of beef scraps, and with a low front to the tray of the hopper they waste quite a little by throwing it out with their bills. The hoppers should be covered with waterproof paper to prevent the food becoming wet if they are placed outside the roosting coops; an excellent plan is to have a small "shelter" to put the food-hopper under, this will protect it from the rain and give the birds shelter also,—a double advantage. This system continues until the sexes are separated, and then we place the males in temporary yards sufficiently large so the birds never eat them bare of grass. Putting the cull cockerels which we intend to market in pens by themselves, we compound a mixture of equal weights corn, wheat, oats and barley, ground as fine as flour if we can induce the miller to reduce it to that fineness, feed it dry and continue the beef scraps as before. This method of feeding market cockerels has given us fatter chickens than we have ever been able to produce bv any other method.

A mixed lot of cockerels is about as uncomfortable a set of individuals as is ever gotten together, and this method of feeding is the only one by which each bird can be fed singly and all get a full share. Here each one goes to the hopper and eats as long as he has plenty of saliva to moisten the food, then moves away allowing a weaker brother to come up and take his turn. They must necessarily eat slowly, because they can swallow only a small amount of this dry mixture at one time, and thus all have an equal opportunity at the food.

Here the digestion of the food begins in the mouth. If the crop of one of these birds is cut open, in place of the sour, partly fermented mess that is found in the crop of a mash-fed chicken, we find the grain as sweet as ever, but smelling as though partly cooked; there is no fermentation of any kind, and we think the crop now does the work nature intended for it to do.

When the pullets go to the laying houses they are fed cracked corn, wheat, oats and barley; fifty per cent. of this, however, is cracked corn. A hopper of beef scraps is kept constantly before them, and we now add a hopper of dry bran. The whole grain is thrown in litter two or three times a day, as convenience dictates. The birds are made to scratch for all of their grain, and there are cabbages for them to eat constantly before them. If cabbages are not plenty we use cut clover, scalded to soften it, fed in deep troughs. We have used with excellent success a dry-mash consisting of twenty-five per cent. corn meal, twenty-five per cent. beef scraps and fifty per cent. bran, fed dry in boxes during the morning, giving what they will eat up by noon, when we give a light feed of whole grain, with a full feed at night. Hard grain is thrown in litter, as previously noted, and while this ration is a little cheaper than the other because the dealers put the poorer grades of corn into their meal, the results are not always so satisfactory as we could wish, and for that reason. A good egg-yield will result from this ration if the ground grain and beef scraps are of good quality. We have no difficulty in getting birds to one or two pounds above standard weight by this method, and we want to say that we believe that ninety per cent. of the chickens raised in this country do not have sufficient quantity of the right quality of food; what is called over-feeding, we believe would be more correctly expressed as improper feeding.

"There are very few breeds that would get too fat to lay if properly exercised, and we have yet to find one of our birds in this condition.

As to fertility, and the strength of the germs, we believe no system of feeding can equal this method. The eggs uniformly test well, and the germs live through and hatch good, strong, bound-to-live chicks that are ready to take up the dry-feeding method as their ancestors did. No weaklings result, provided the other conditions surrounding the birds are right, one of the most important of which is an abundance of fresh air; and our fowls will stand an almost unlimited amount of this if the houses are free from draughts, and they are not subjected to the daily sweating over a hot mash. Each generation of these youngsters seems hardier than their ancestors, are more cheaply raised, for any up-lifting of the general health of the flock must be reflected in the decreased mortality of the youngsters.

The labor saved is no small item, for the difference between feeding the chicks three times a day with grain, plus the cooked Johnny-cake, or heating the water and stirring up the mash for a large flock of hens, and having the food almost always accessible to the chicks in summer, and the dry-mash with throwing the dry grain in litter in winter, amounts to a saving of a third to a full half of a man's time and physical energy; all of which we have demonstrated to our complete satisfaction is labor wasted. This labor directed to other details, and the poultry work is full of them, will grow the chicks and care for the flocks much better, or will allow double the numbers to be kept with the same number of steps taken daily. Experiment has demonstrated that quite as many eggs will result, as by the mash-feeding system; any old stock that is kept over will be found to lay nearly as well the second year as the first; the birds lay better through the molt; there is less mortality among the adult birds, and the profits will be found to be on the rights side of the ledger when the accounts are made up.

An excellent test of the dry-feeding method was made at the Main Experiment Station this last year, the report given in Bulletin No. 117 of that station confirming many of the claims made by the advocates of the dry-feeding method of rearing chicks and feeding adult fowls.

Last June we had 1,400 chickens well started, and we changed the plan of feeding by keeping cracked corn, wheat, and beef scraps, in separate slatted troughs where they could help themselves whenever they desired to do so. Not more than one-fourth of the grain was wheat for the pullets, while in the cockerel division nothing but cracked corn and beef crap were fed. Grit, bone and oyster shell were always supplied. There were no regular hours for feeding, but care was taken that the troughs were never empty.

The results were satisfactory. The labor of feeding was far less than that required by any other method we have followed. The birds did not hang around the troughs and over-eat, but helped themselves— a little at a time— and ranged off, hunting or playing and coming back again when so inclined to the food supply at the troughs. There was no rushing or crowding about the attendant as is usual at feeding time where large numbers are kept together. While the birds liked the beef scrap they did not over-eat of it.

The birds did well under this treatment. The cockerels were well developed and we never raised a better lot of pullets. The first egg was laid when the oldest pullets were four months and ten years old. For the last six years the pullets have been from four months and ten days to four months and twenty days old when the first eggs were found.

The dry-feeding was continued with the pullets thus raised, with decidedly satisfactory results. The report says:—

On the first of last November we began feeding 550 April and May hatched pullets wholly on dry food. They were in the curtain-front houses with warm elevated roosting closets and in flocks of 50, 100 and 150. At five o'clock in the morning the flocks of 50 birds were given two quarts of cracked corn; at half past ten o'clock they had one quart of wheat and one quart of oats. This dry material was all spread on the litter on the floor but was not raked in. Along one side of the pens were feed troughs with slatted fronts, in which was kept a supply of the dry material of which the moist mash, before described, wac composed. These troughs were never allowed to remain empty when the supply was exhausted. The dry mash was constantly within the reach of all birds and they helped themselves at will. Oyster shell, dry cracked bone, grit and charcoal were accessible at all times. A moderate supply of raw mangels and plenty of clean warm water was furnished them. When they were first put upon this ration they were not acquainted with the dry mixture in the troughs and ate of it sparingly, but in three or four days they were using as much of it as at any later time until they got to laying heavily. When the feeds of cracked corn, wheat and oats were given, the birds were were always ready and anxious for them, and would scratch in the litter for the very last kernel before going to the troughs where an abundance of food was in store.

It was very evident that they liked the broken and whole grains better than the mixture of the fine materials; yet they by no means disliked it, for they helped themselves to it,—a mouthful or two at a time—whenever they seemed to need it, and never went to bed with empty crops so far as we could discover. They apparently did not like it well enough to gorge themselves with it, and sit down, loaf, get over fat and lay soft shelled eggs, as is so commonly the case with Plymouth Rocks when they are given warm morning mashes in troughs.

Some of the advantages of this method of feeding are that the smash is put in the troughs at any convenient time, only guârding against an exhaustion of the supply, and the entire avoidance of the mobbing that always occurs at trough feeding when that is made a meal of the day, whether it be at morning or evening. There are no tailings to be gathered up or wasted as is common when a full meal of mash is given at night. The labor is very much less, enabling a person to care for more birds than when the regular evening meal is given.

We cannot give the results of a full year's feeding in this way, as we have practiced it only from the first of last November to the close of June. The number of hens lost during the winter has been less than ever before, even when they were kept in the same style of houses. We can ascribe this to no other cause than that the birds did not overload with food at any time. We have never had so many eggs laid during the winter months by a like number of hens.

The average yields of the 550 hens during March was 20.4 eggs per bird. The whole number of eggs laid by them during the six months from November 1st to April 30 was 42,126, an average of 76 per bird. It must be borne in mind that these birds were not selected but were the whole number of chickens reared last year.

The most radical of all methods of dry-feeding is that followed by Mr. Tillinghast, of Vernon, Conn., and he, literally, feeds his birds but once a week and waters them not at all. As to the watering, the birds go to nearby springs or a tiny brook to drink, and when the springs and brooks are frozen and there is snow on the ground they eat snow for their drink.

The remarkable thing about Mr. Tillinghast's feeding-method is the very few grains he feeds, the ration is almost wholly wheat screenings and beef scraps, and they are kept in hoppers, one of each in each house, and are accessible to the birds all the time. The hoppers for the wheat screenings are made from good sized boxes, shoe boxes chiefly, and will hold a bushel or more each—a supply amply sufficient for a week for the fifty or sixty birds in a house. The hoppers for the beef scraps are about eight inches square by a foot and a half high, and will hold something more than a peck each. These two hoppers of food are refilled once a week, and an ample supply is always at hand.

The very small addition made to this ration is a remarkable feature of it. In the winter time about a quart of cracked corn is thrown on the scratch litter on the floor of each house, about the middle of the afternoon, when the wagon is driven around to collect the eggs. During summer the beef scraps is likely to become caked in his hoppers, so they will not feed down, and for that reason Mr. Tillinghast stops filling the scraps-hoppers about the first of May, and puts about a pint of beef scraps in a feed trough in each house at time of driving around to collect the eggs. The birds have free range over the fields and orchards in which the houses are located, and in summer can get abundance of green food; in winter a supply vegetable food, of such roots as mangels, turnips sugar beets, or refuse squashes, is fed out to them, and a wire-netting pocket of cut clover, dry, is hung against the wall for them to pick from,—it is surprising what a quantity of this cut-clover the birds will eat, and it seems to fill a manifest want in the balancing of the ration.

The first question that arises is as to the profits when poultry is kept on this go-as-you-please plan, and unfortunately Mr. Tillinghast does not give us figures of egg-yield to prove the profits. It will be evident that the work of feeding and caring for the flocks is reduced to the minimum, and as Mr. Tillinghast is increasing his plant and stock each year, he is evidently satisfied with the results. He has housing capacity for about three thousand head, and last winter had about that number of birds on his place; it is his intention to increase to eight to ten thousand head, and he claims that he can himself care for five thousand head of layers housed and cared for upon his plan.

We visited him in mid-winter, and saw some houses of pullets in which the egg-collection of the day was about fifty per cent. of the number of birds in each house, a result that any one would feel was quite satisfactory. As illness had preveted his getting out so great a number of chickens as he had intended, he was carrying over a very large proportion of old stock, and those old birds, while laying some eggs were, as always, laying scantily. At that visit we personally went around to more than three-fourths of the houses, and saw but one bird of all the great number we inspected, that gave any indication of indisposition; that bird was sneezing, which indicated a slight cold. We visited him again this summer, when the hens were moulting, and of all the birds we looked over, probably over three thousand in all, saw but two that seemed out-of-condition, and the egg-yield at that time was quite as good as could be expected in moulting time; some of the pullets had even then begun to lay.

It is evident that if a ration which is nine-tenths wheat screenings supplemented in winter with a good feed of cracked corn, will give such a good showing in general healthfulness of the flocks and egg-yield in mid-winter, then we who have expended a great deal of time in compounding a mixed ration and feeding three times a day have thrown away our labor and pains. The tables of analysis given in Bulletin No. 22 of the U. S. Department of Agriculture, show wheat screenings to have a feeding value very closely approximating to that of good, sound wheat, and that wheat is the best food of all the grains is very well known.

That wheat screenings is a very economical food, there is good proof in an experiment made at the Connecticut Experiment Station last summer. Prof. Graham wished to test the Tillinghast method of housing and feeding chickens, and had built two colony houses exactly like his. In one of these houses he put 44 Rhode Island Red chickens, that were hatched April 24th. Twenty-four of them were pullets and eighteen were cockerels; on the 29th of July the cockerels were killed and dressed for market, they averaged to weigh 3½ pounds a piece undrawn and sold at the wholesale market price for 82 cents apiece. The cost of food for both themselves and the 24 pullets to that time was $4.28, the 100 eggs cost $5, making $9.28 as the cash outlay for the 42 chickens at about fifteen weeks old, and there had been a cash return of $14.76 for the cockerels sold, and the 24 pullets were left. On the 8th of September one those pullets began to lay, when about 4½ months old, and in the month of September 48 eggs were laid by that lot of pullets. Their food for the first two weeks was commercial chick-foods, bought off dealers in poultry supplies, and after that was wheat screenings supplemented with what insects, worms, bugs, etc., they could pick up on range. Not at atom of meat-food of any kind had been given them, no milk or other animal food, and here we find the remarkable showing of Rhode Island Red pullets reaching laying maturity at 4½ months old on wheat screenings alone, supplemented by the animal food picked up on range. We feel justified in calling this a *remarkable* showing.

And the grand total of results, as evidenced by the testimonials coming from many different sources, all point to an equally remarkable showing in favor of the dry-feeding method of feeding both chicks and fowls. The general health of the flocks is better than where the cooked mash was fed, the eggs are larger, stronger-bodied, more fertile and hatch out strong, vigorous chicks, chicks that are of the bound-to-live kind, and that are the delight of their owner. Here is one reported test of the fertility of winter eggs from dry-fed hens:

A Mr. Boulton, living in Connecticut, was advised by a neighbor to send to Dr. Nottage for some eggs from which to hatch early chicks, and sent him and order for a hundred eggs, in February; the following is his verbatim report upon them:

"We put yours in one tray (100 eggs) and marked them, and in the other tray put a hundred eggs from a man of a great deal of reputation who feeds mash. I wanted to test the difference, thinking it might show in the fertility. Of your hundred, 16 were infertile, and of his, 64; I paid the same price for both, and I think the result shows well for your method of dry-feeding."

Experienced incubator operators well know that the measure of fertility is (approximately) the measure of weak germs left in the machine at first test, and expect that about the same proportion of the eggs will fail to hatch that there are infertile. As 64 per cent. of the eggs from the mash-fed hens were infertile, it is fair to suppose that 64 per cent. of the 36 eggs remaining would be weak germs and fail to hatch. That would give 23 (plus) weak germs, and a "fair expectation" of 13 chicks to hatch. Of the dry-fed hens' eggs there were but 16 per cent. infertile, which would indicate but 13 (plus) weak germs, and a "fair expectation" of 70 or 71 chicks to hatch." Certainly—quite a difference there.

At the Jordan Farm, Hingham, Mass., they raise several thousand chickens each year, with practically no loss from that scourge of chickenhood, "bowel trouble," and all the food for the first weeks is Cyphers' Chick Food. The result of this simple feeding-method is a most gratifying growth of the youngsters, who seem to have no set-backs, and to grow "naturally," to grow from the start, without having any time lost or backward slips to make up.

The most remarkable growth of young fowls is of which we have ever heard was a pair of Barred Rock cockerels castrated, and grown to be "soft-roasters." They were killed the day they were six months old, and weighed (the pair) twenty-three pounds live weight, and the larger one weighed ten and half pounds, dressed. They were grown on a ready-mixed chick food for the first weeks, with cracked corn added after the first four or five weeks to increase the ration, and beef scraps. The last two months the ration was cracked corn and beef scraps, and the total result was a growth never equalled by any other method of feeding.

A New Jersey friend writes me: "My young stock this year are simply wonders! Some of the pullets are already showing good sized combs and wattles, and from appearances look as though they would lay by middle of September. Some of the capons, hatched March 23rd, will weigh 5½ to 6 pounds now; certainly a fine testimonial to the dry-feeding method. All I have had to do was keep the hoppers filled, and they did the rest. I find I am this year raising three times as many birds as last year, with only about one half the labor."

Let us, however, turn again to the Maine Station bulletin and quote the statement made there. This is a State experiment station bulletin, and the statement has the weight of an official report. It says:—

"The number of hens lost during the winter has been less than ever before, even they were kept in the same style of houses. We can ascribe this to no other cause than that the birds did not overload with food at any time. We have never had so many eggs laid during the winter months by a like number of hens.

"The average yield of the 550 hens during March was 20.4 eggs per bird. The whole number of eggs laid by them during the six months from November 1st to April 30th inclusive was 42,126, an average of 76 eggs per bird. It must be kept in mind that these birds were not selected, but were the whole number of pullets reared last year."

"Doesn't that have a triumphant ring to it? Isn't that a most convincing proof of the great gain of dry-feeding? That, "We have never had so many eggs laid during the winter months by a like number of hens," and, "The number of hens lost during the winter has been less than ever before," covers the whole range of profitable work in egg production. When we get more eggs during the winter months and fewer birds die we may feel reasonably certain we are upon the right road, that we are making the best of success with our poultry work. Outside of the question of the substantial saving in labor, and there is a decidedly great gain there, the better growth of the youngsters, and the better health and greater egg-yield of the laying stock, gives us the most convicing argument for adopting the dry-feeding method of carrying for our poultry.

THE ONTARIO AGRICULTURAL COLLEGE AND EXPERIMENTAL FARM.

By G. C. Creelman, President O. A. C., Guelph.

Just a word of welcome. We are delighted to have you with us, we are sensible of the good work you are doing for the country, and we want you to feel quite at home in our college hall or our college grounds, and in and about our college buildings.

I want to speak to you about the College, which was established in 1874. Its objects were twofold: First, to train young men in the science and art of improved husbandry; and second, to conduct experiments and publish the results. In 1875, the President said in his first report: "It is evident to the most cursory observer that Canada depends, and will be obliged for many years to depend largely, if not exclusively, on her raw produce for her national wealth. And amongst the various forms of raw material, none are so valuable as those included under the head of Agricultural Produce. To the observant statesman, it is plain that the readiest manner of increasing the national wealth is by increasing the quantity and quality of that produce. But though plainly seen, it is not so easily accomplished. Precedent, prejudice, and general conservatism stand in the way. Throughout the Province there is a powerful minority of intelligent, enterprising, and successful farmers pursuing the improved system of cultivation; yet the great majority are depending solely on increased acreage for increased returns."

That was thirty years ago, and the College, facing these conditions, with the opposition of the very class which it was intended to help, has grown steadily in favor with the people, until now farmers themselves visit the College in June and December to the number of nearly 40,000, and we had last year in attendance at the various College classes 1,004 students. More than 1,200 teachers visited the College and examined the workings of the different departments during the past two years.

In the beginning students were paid to attend the institution, and there was pratically no revenue from the College or farm. In 1905, we turned into the Provincial Treasury as revenue from the College and farm $61,568.20. The work of the different department is as follows:—

(1) *Field Agriculture.* Teaching of students and experimenting with field crops is the work of this department. In Mr. Zavitz' report of last year, the following paragraph appears under the head of "Barley": "The results show that the Mandscheuri gave decidedly the greatest yield per acre of the four varieties for the whole period of fifteen years, and also for the last five years. The Mandscheuri gave an average of 9.3 bushels per acre per annum over the common six-rowed barley in the average results for fifteen years. The average area devoted to barley in Ontario from 1882 to 1904 is given as 633,290 acres per annum. An increase of nine bushels of barley per acre throughout the Province would, therefore, amount to an increase of over five million bushels of barley in Ontario annually. This increase at fifty cents per bushel would amount to about two and a half million dollars. Two and a half million dollars annually would pay the running expenses of about thirty Agricultural Colleges like the one located at Guelph. The Mandscheuri barley was imported from Russian by the Ontario Agricultural College in the spring of 1899. Not only has it made a very excellent record at the College, but it has given high results in the co-operative experiments throughout Ontario and has been grown in general

cultivation very successfully during the past few years. In looking up the records of the Bureau of Industries, we find that the average yield of barley throughout the Province for the period of ten years from 1895 to 1904, inclusive, is 29.3 bushels per acre; while that for the period of ten years from 1885 to 1894, inclusive, was 24.85 bushels per acre. This shows an annual average increase of about 4½ bushels per acre, for the latter as compared with the former period of ten years. From these results does it not appear as though the introduction of the Mandscheuri barley by the Ontario Agricultural College has been worth to the Province of Ontario within the past ten years an annual money value equal to more than fifteen times the entire cost of the College?" Similar work is being done with wheat, and oats, and peas, and rye, and grasses, and clover, and roots.

(2) *Animal Husbandry.* Here students are taught the comparative values of the different breeds of domestic animals, and as it is said that 80 per cent. of all the crops grown on the farms of Ontario is fed to live stock, it will be seen at a glance how important it is to be able to tell a good feeder when one sees it.

(3) *Dairying.* The making of better butter and better cheese and the breeding and feeding of better dairy animals. The average cow in Ontario gives less than 3,000 pounds of milk per year. The College, by careful selection and proper feeding, has built up a grade herd which, in 1904, contained sixteen cows which gave more than 6,000 pounds each.

(4) *Horticulture.* Here we are samewhat handicapped by severe climatic conditions. Being 900 above Lake Ontario, we cannot grow the more delicate fruits. Students are given instruction in the growing of all kinds of fruit, vegetables, and flowers, and experiments are conducted with the small fruits and with cover crops for the orchard.

(5) *Bacteriology.* Nitrogen is one of the principal needs of a plant. It is worth, commercially, about 20 cents a pound. The air is 80 per cent. nitrogen, and yet plants cannot use it in the form in which it appears in the atmosphere. Certain bacteria, if introduced into the soil, will work on the roots of clover and other leguminous plants, take the nitrogen from the atmosphere, and convert it into plant food. Our bacteriologist propagates in his laboratory and supplies in small bottles millions of the these nitrogen forming bacteria, which may be spread upon the seed before it is sown, and thus introduce into the soil these nitrate forming bacteria. A crop of clover will leave in the soil in the roots alone about fifty pounds of nitrogen per acre. Thus the plant food supplied to the soil by a crop of clover is $10 per acre in one year, and the farmer has the clover crop, tops, and leaves to the good. This, if practised on every farm, would mean millions each year to this Province.

(6) *Chemistry.* It was said a few years ago that sugar beets could not be grown profitably in this Province. Our department of chemistry conducted experiments in the different parts of Ontario, and analysed the beets at different stages of growth. It is now known that we can grow as good beets as in any part of the world, and men are putting their money into the building of sugar beet factories. Over 22,000,000 pounds of beet sugar were made in western Ontario last year. Chemistry did it.

Our chemistry department last year analysed flour made from four different grades of wheat grown in the northwest. There was a difference of many cents per bushel in the market value of these wheats, and yet, after analysing the flour and having bread made from each of the different lots, it was found that the fourth grade made bread just as good, just as palatable, just as much bread per bushel of flour, and just as nutritious as the higher grade, but it was not so bright in color. The result of this analysis will enable poor people, or people, in moderate circumstances, to get the best bread for their families at very much less than they have been paying.

(7) *Physics.* In this department are taught the principles of soil cultivation and soil drainage. All farm crops take their food from the soil in a watery solution. When the land dries up, no more food can be taken; hence the necessity for a knowledge of how to conserve soil moisture. This is one of the most important questions that a farmer has to deal with, and experiments are being conducted in the department of physics all the time along these lines.

(8) *Botany.* In this department the subject of weeds and how to destroy them, the question of fungus growths, and when and how to spray to exterminate them, the importance of growing grasses and clovers, and such things are taken up and discussed.

(9) *Entomology.* Again, millions of dollars are lost every year by insect depredation. Only by studying the life history and habits of an insect can it be properly combatted. These are taught to the farmers' boys, and bulletins are published and sent broadcast to the farmers from our entomological department.

(10) *Poultry.* Chickens used to sell any where on the market from 20 to 30 cents apiece. To-day they bring three times that amount, where they have been properly fed, killed and dressed. We have no trouble in disposing of our poultry here at from 12 to 15 cents a pound dressed, and our students are taught how to breed and feed so as to obtain these results. We have four different styles of poultry houses, to test the effects of heat and cold on the egg-laying proclivities. We find that the coldest, and therefore the cheapest house, is the best, and that fresh air, not warm air, is essential to good egg production.

(11) *Macdonald Institute.* Three things are taught: domestic science, manual training, and nature study. In domestic science there were 360 girls in attendance last year, each one being obliged to learn cooking, sewing, and laundry work. In a Province where over 90 per cent. of the women do their own house-work, what a classing it would be if they were all properly trained for their daily duties. Manual training makes boys and girls handy in the use of simple tools, and nature study, which is really elementary agriculture, helps teachers to the extent that they may return and give to their pupils an education that will more nearly fit them for the earning of their daily bread.

The College is then doing three things: First, fitting boys and girls for their life work on the farm; second, by experimenting along different lines, it is saving the farmers millions of dollars each year, by securing for them exact data in reference to the value of different farm crops, farm animals, and so forth; and third, by the writing and publication of bulletins and reports. the farmer is supplied in his own home with reliable information in reference to his business.

INCUBATORS AND INCUBATION.

By James L. Nix, Homer City, Pa.

Incubation is a very broad subject. Only by collecting the various experiences of workers in the field could a basis be formed for the truth, because, the science of artificial incubation is only about one per cent. of facts and the balance is guess work. We are in the fairy stage of artificial incubation, and the facts associated with it are so obscure that one cannot expect to differentiate the esential from the unessential. The modern incubator is the result of a great deal of experimentation. Many very bright people have worked very earnestly on the subject, and I do not know of any department in which more people are engaged than there are in artificial incubation, because every one who has an incubator does more or less experimental work, and there are hundreds and thousands of them in use. The best incubator we have to-day is capable of great improvement, and most incubators we have in use will give good results if used intelligently. We have in the United States one hundred and thirty manufactures of incubators who advertise, and there are numbers who are known only to the makers of thermometers. These manufacurers employ from three hundred and fifty men down, and they yearly output 240,000. No one knows exactly how many are manufactured. They turn out in the city of Buffalo 34,000 incubators, and in Clay Centre, Nebraska, about 30,000. An incubator is an essential thing for every farmer. The backbone of the artificial rearing is the utility end of it. I do not suppose one-tenth of one per cent. of incubators used are used by fanciers, because they are such a small end of the industry. We do not realize the capabilities of the poultry industry, and do not give it the thought and attention we should. A great many people have devoted a great deal of time and attention to birds for symmetry, shape and feather, but very little attention has been given to utility. Some fanciers, too, have a lot of culls, pen them up, and sell the eggs cheap, and call them utility birds, but they are nothing but culls. The utility birds should be bred more scientifically than fancy birds. They have to use trap nests and the pedigree system, and they should work for the two hundred egg hens, and I believe it is capable of accomplishment. Sufficient care has not been paid in the past to the development of fertility in the egg. A good vitality is capable of transmission the same as any other characteristic of the bird.

It does not make much difference how good the incubator is that you have if you have not a highly vitalized egg. You must have the blood for generations back for fertility, and this means a great deal of work for somebody, quite a good deal of close attention, and it means the use of trap nests, and the labor and trouble and detail of everything connected with it.

If we do not use artificial methods of incubation the product would amount to almost nothing compared to the requirements of the present time.

The incubators that are manufactured in the far west for the western farmer, are used only in the natural season April and May. These incubators are very cheap and sell for ten dollars, and have a narrow range of effectiveness. You cannot operate them in a temperature of under 65 or over 85 degrees.

On the modern poultry plant where they raise green ducks, soft roasters, and broilers, they hatch for about ten months in the year; for instance the Curtiss plant hatches for ten months in the year. Hallock's plant, Long Island is devoted almost entirely to ducks, and they use 131 incubators with a net capacity of 288 eggs each. I met Mr. Hallock at the Madison Square show, and he told me that he frequently had batches of incubators hatching together, and they had an average of 240 ducks from 288 eggs.

Mr. Graham: That is 288 set?

A. No, fertilized eggs. Successful duck men are very secretive about their methods. I spent a month at Hallocks' farm at one time, and I learned absolutely nothing.

Mr. Nix: They claim this information cost them a great deal of money, and no doubt it has, and they will not give it away. We did a little duck hatching last summer, and we have a flock of ducks, and we are going to engage the best duck incubator operator in the United States, and we are going to get his methods.

Mr. Graham: We would like to know your idea about incubators.

Mr. Nix: Incubators are divided into two classes, hot air, and hot water. That is not a true division, because you can only divide incubators in classes by the methods in which the heat is applied to the eggs. We have three methods of heating the eggs: heating by diffusion, heating by radiation, and heating by contact.

The hot water machine may be of any of these three methods, and the hot air machine may be of any of these three methods, and in the hot water or hot air machine, the use of the radiation system gives exactly the same results, provided you have a perfectly constructed machine, one that does not leak. About half the incubators in use to-day are of the diffusion type. There are no machines on the market of the contact type.

The first incubator made in the United States of the contact type, consisted of a hot water tank, the lower part of which contained a rubber diaphram and the eggs were placed on spiral springs in the tray, and the tray on a lever arrangement that brought it up in contact with the tank. It never proved a commercial success. The trouble is, it was impossible to get the eggs out of the shell when the chicks cracked the shell and start to open it; the springs would push them up and crash them. A company built a contact heat incubator last year and they had the same trouble, because the chicks get crushed in getting out. We are experimenting on that type of incubator, because I believe it is going to be the final type. There are a great many things about natural incubation that are essential, and we do not know what is essential and what is not. There are a great may things that a hen does that are not necessary. She does a great many thing merely by accident, and without necessity. I know a hen heats the top of an egg, and all my experiments have shown that the germ does not develop properly unless there are two degrees or over difference between the top and bottom. The exact difference of temperature has not yet been determined. In the old Egyptian method and the Chinese method they do not seem to take that point into consideration. They use bottom heat, and as far as we are able to determine they may be getting better results than we do and they may not.

Mr. Graham: Do you know anybody who has visited these Egyptian ovens?

Mr. Nix: No observations have been made by people familiar with the art of incubation, and those who are not have overlooked many essential points. Last year we conducted a series of elaborate experiments to determine the best method of supplying heat to an incubator. No incubator that uses bottom heat has ever proved a commercial success. I find that the contact method raises the most germs, the radiant heat comes next and heat by diffusion comes last. We had three and four machines of the same type in a row operating in the same room, under the same conditions. They were operated by myself personally. The manipulation was the same, and the temperature the same, and when the eggs were brought in I would take one egg from each dozen and go down the row putting one egg in each tray, and then I would shuffle them around again so that I could get the same percentage of good and bad eggs in each tray, and the fact that it was so was borne out when it came to the first test when I found that the diffusion incubator showed a certain percentage of fertile eggs, and the contact showed a certain percentage of fertile eggs, and the difference seldom exceeded five per cent. The difference between the two types of incubators ran as high as 54 per cent. and as low as 5 per cent. The radiant heat machines were within 5 per cent. of each other, and the diffusion machines within 5 or 10 per cent. of each other; but, comparing one class with the other, the difference in development ran from 5 to 34 per cent. in the number of germs that would start. The percentage that would start varied with the fertility of the eggs, and I found the stronger the egg the less the difference, and the weaker the egg the greater the difference. We were trying to determine whether we would manufacture the radiant heat type or diffusion type. The diffusion is the cheapest, more economical in manufacture and easier for the beginner to operate. Then it has not the same variation in temperature between one part and the other as the radiant heat type. There are a great many things in favor of the diffusion type of incubator. After working with this incubator we did not put it on the market, because we secured so much better results with other machines. I cannot claim I have discovered a law in artificial incubation, because that is the result of but one season. My results will be checked this year at this station, and I have tried to induce Prof Gowell to try an experiment. The way we tried the contact heat was with the old hen. I discovered in the experiment with the radiant heat that the germ would start all right but would die during incubation, and the result was there would not be over 6 or 10 per cent. difference between the diffusion type and the radiant heat type, but when the bottom was knocked out of the machine, the difference in the results ran from 5 to 33 per cent. in favor of the one with the bottom knocked out. I attribute that to the value of diffusive ventilation. I believe in the fresh air theory of germ development. My individual experience has taught me that is the best; but, a year from now I may find something else is better.

Mr. GRAHAM: Have you any choice between diffusive ventilation from the side or the bottom?

Mr. NIX: I would not think it would make any particular difference. In natural incubation you get ventilation from the side. There is an incubator know as the Hacker that is ventilated from the side. In germ development you find direct current of air very injurious. If you could change the air in an incubator by diffusion and have the air absolutely pure you get a better germ. You will find a great deal in the poultry papers of the present time with regard to open front houses. It is used very extensively around Boston and Syracuse, and one of the leading men who use the open front house is Mr. Tolman. He does not even use a drop curtain. The front of his house is entirely open on one side and perfectly air tight on the other sides, and you will be surprised to see how warm that house is. It is the same principle as blowing into a bottle—the air does not go in.

Mr. GRAHAM: How cold does it get in Homer?

Mr. Nix: Last week we had it 7 below zero, during which these hens gave a good egg production. They have been making tests for fertility, and how that comes out I do not know. In rearing little chicks last summer I got the best results by keeping them as near as possible out of doors; and what is true of old birds and young chicks I believe is true of the growing germ in an incubator, because it is only a chicken after all. And if you can get fresh air around the germ I believe you can get the condition which approaches nearer to the condition of the old hen and when it comes to the time for the chicks to get out, they will get out and you will not find them sticking to the shell. Where the air is bad in the incubator you get a retarded development. The chick is over size, and the shell full of water, and the operator thinks he has been giving too much moisture, and then he tries to put air currents through the machine, and the last condition is worse than the first. With the open bottom machine last season we never had over 5 eggs on an average left in a hundred egg machine; but with a tight machine we would have from 15 to 20 left in the shell, and these tests were made with the same eggs, under the same conditions. Then I tried the open bottom with the diffusion type of machine, and I found it was of no value, and the results were not quite as good as with the tight bottom. One manufacturer used an open bottom machine some years ago, and it was not a success, and he abandoned it in favor of the slat bottom. The most careful experimenters will get opposite results, and it is one of the most difficult things to say when you are right. I do not say anything as a positive fact, because subsequent experiments may modify it, and the results you obtain at one time may be caused by something that you are not aware of. Artificial incubation is an obscure thing. We are dealing with life, and we have not any method of determining life. Neither our chemical processes nor science enable us to know in the slightest degree what it is. We can only see manifestations, and we see certain things will affect it, and that is about all we know about it.

A Member: Have you any system of testing the air in an incubator as to whether it is pure or not?

Mr. Nix: I am situated in a small country town where we do not have the advantage of chemical laboratories, and I have never made any experiments in that line. Chemistry has not thrown very much light on the subject.

Mr. Graham: Did you notice any difference in the air cells between strongly vitalized eggs and the weaker ones?

Mr. Nix: Yes.

Mr. Graham: I noticed that some of the eggs from hens fed by the dry method, the air cell was wavy, a different shaped air cell altogether from the other ones.

Mr. Nix: The irregular air cell shows that the chick is muscular. If you take a week egg there will be a superabundance of fluid in the shell, and the air cell becomes irregular in shape at the close of the hatch.

Mr. Foley: What amount of air do you think is necessary for incubation?

Mr. Nix: I do not know the exact amount. Some operators of big machines run all the air they can get through the machine, and the man at Allantown runs his big machine without any ventilation at all. He shuts the ventilators up tight, fills his pan full of water, and keeps his floor wet. He says you cannot give a duck egg to much water. If I did that I would never get a duck hatched.

A Member: I believe in the use of a hygrometer in the incubator room. I have tried to run up the humidity by throwing water on the floor, and you would be surprised how perfectly unconcerned that hygrometer was to the water. (Laughter.)

Mr. Graham: Did you ever try warm water?

Mr. Nix: No, but it certainly effects the eggs if you throw water on the floor.

Mr. Graham: We ran two machines in this room in December, and we scrubbed the floors with hot water, and that would run up the hygrometer 20 points; but, I could never do that in the incubator cellar.

The Chairman: The evaporation of hot water must be greater than that of cold water?

A Member: When the machine is heated by hot water coils the temperature is much higher inside of the machine. Do you think the vitality is affected in that way?

Mr. Nix: I have often thought so. The only way to determine that fact is to run a machine along side of it, in which the air is heated by hot water coils. I think there is a machine made in that way at the present time, and I am trying to determine that fact. You can only determine the facts of incubation by comparative experiments. One of the most difficult things in incubation construction is distributing the heat, getting a uniform temperature throughout the machine, and you will get colder air in the corners than you will in the centre.

The first incubator even constructed was on exhibition in London in 1829. It was a hot water incubator, and to get a uniform heat they had an agitator in the centre tank that ran by power, and you would get a perfectly uniform distribution of the heat by the agitator method. But still you find that the centre tray would be much warmer than the corner, and that was overcome by packing the tray. But one difficulty about that was if you got it right for a cold room, then it is wrong for a warm one. The agitator is impossible in small incubators. Then they made ten inches deep, and the water in the upper part of the tank, and they depended upon this great depth of water to get an even temperature. But, there was a great difficulty in that; when they got warm they would not cool off again. One of these tanks would not cool off in a week, and the animal heat in an egg comes up very rapidly in the twelfth day, and if it happened to turn warm you could not get the eggs cool. Then the next thing was to use an exceedingly shallow tank, and they tried to get a uniform heat by what is known as the labyrinth circulation. The water came in at one corner and went round and round; and they were always having trouble with that system, because, the hot water enters at a very high temperature and goes out cold.

The next development was called the gravity system, the one we use at the present time. It is not perfect by any means, but it is the best method of heat distribution I know of at the present time. The hot air pipe comes in at the centre and front; this is made a vertical flue. It makes an upward draft, and passes over the top and down the side, and in the partition you get the same circulation as they had with the mechanical agitator.

We have at the present time only two types of regulators in use, the mechanical thermostat and the wafer regulator. The wafer regulator is the most extensively used on account of its simplicity and cheapness. The cost of a wafer regulator runs from 22 cents to 35 cents. The other type of regulator costs more. The great difficulty with the wafer regulator, however, is that it is influenced by any violent change of barometic pressure, and then the ether and alcohol with which the capsule is filled gets away in the course of time. Sometimes it will get away suddenly. The average life of a well-made wafer is about four years; sometimes they will last seven, and sometimes they will only last a few days. A bulletin issued at Washington says the wafer regulator is the only kind in use.

There is one thing about the mechanical thermostat, and that is it is good for all time, and at no time in its life is it exposed to temperatures that will exceed the elasticity of the metals of which it is composed. We have some that we have used for twenty years, and they are always ready for work. A thermostat placed above eggs maintains a uniform temperature. but the eggs are also affected by the cold that comes from the bottom of the machine. The compensating type is much better, but if you put a thermostat in a incubator with this compensating feature, you introduce trouble to a certain extent, because if you adjust the regulator with the thermometer at 103° with an empty machine you are apt to get a temperature of 107° and spoil your eggs before you get started. The thermostat is properly adjusted when you put a piece of paper on the tray so as to cut off the heat from above on the lower bar and then adjust your thermostat to temperature desired. And then another trouble with the compensating thermostat is that if the machine is not full it will not record properly, because at one time the eggs will be in one end of the machine and when you turn the tray they will be at the other.

Mr. Graham: In case you only had 25 eggs out of 100 where would you put them?

Mr. Nix: In the centre of the tray.

Q. What machines have the composite thermostat?

A. No machine but the Prairie State. Some manufacturers claim that the nursery is the detriment, but it has been our experience that a nursery is an advantage. It hardens the chicks off and then drys them, and they stand the change from the incubator to the brooder with less trouble.

Q. No danger of crippling them?

A. Cripples in the incubator are caused by too much heat.

Q. In what way?

A. I do not know the real cause of it. Of course cripples can be caused by improper condition of the breeding stock. The majority of cripples are caused by hot places in the incubator. That is one reason why certain incubators have a majority of cripples.

Q. What would you think if the temperature went so high that you could hardly believe it, and then you made a hatch without a cripple?

A. I do not know how that would be.

Q. Do you think there would be a danger of cripples being caused by delay in coming out of the shells?

A. Yes, crooked toes and legs can be caused by that. A chicken that remains in the egg 22 or 23 days usually has crooked toes and legs.

Q. Do you think that malformation can be caused by turning the eggs?

A. Yes, I think that might cause it.

Q. What do you think about the turning rack in the machine?

A. I have used a turning rack and secured very good results. I believe the best egg tray is a perfectly flat one without any slats or anything. We used a flop over tray a good many years ago. I think you lose 5 per cent. with a flop over tray and with a slat automatic tray you lose 10 per cent. With a slat tray or any kind of automatic tray, occasionally an egg will not turn and they invariably leave a few eggs in the wrong position and when they are left in that way the embryo gets a wrong presentation, turned in the shell, and when they hatch they try to get out at the little end, in which position it is a great deal more difficult for them to get out.

Q. Do you think it is best to always keep the large end of the egg up?

A. I think the theoretical position of an egg is the position it assumes on a flat surface and the nearer you get to that position the better.

Q. Have you had much experience with working with the little ends and the big ends.

A. No.

Mr. Graham: I have tried three or four hatches and they have always come best on the flat.

Q. How did you like the electric regulator they had in New York?

A. It is all right as long as it works. Electric regulators were used by incubator manufacturers with but few exceptions some 25 years ago. There never was and never will be a regulator made that is perfect. If you use a mercury thermostat a sediment will form a little ark in the top tube, and in the mercury tubes with platinum points the current will not flow. If you use a mechanical thermostat they will often come together, and no current will pass if there happens to be a little jar in the room. Take the electric regulator, if there is some motion and jar in the room they will work fairly well, but if you put them in a perfectly still place there is always danger of the points touching and the current not passing. I only sold one incubator with an electric regulator, and I stopped it because I spent half my time on the road between the incubator and my place of business.

Mr. Hunter: They have a new method in Ohio, a round incubator.

Mr. Nix: A round incubator is all right. They claim it has a more uniform heat than the square one, but that is not carried out by actual practice, because you still have the hot centre and cold sides to contend with, and it is just as difficult to get a uniform heat as in the oblong incubator. In these round incubators they have loose pieces of felt you can take out according to the weather.

Mr. Hunter: Dr. Nottage uses that incubator, but he also believes in fresh air. His houses are open to fresh air, and his farm is on the Berkshire hills. Theoretically, the best location for an incubator is a well ventilated cellar; the only problem connected with it is ventilation.

Prof. Graham: Why not make an incubator that will operate out of doors?

Mr. Nix: I operated incubators in the cellar last year and some out of doors. The first thing in operating an incubator is to see that you have an even temperature. I believe incubator operators do not use thermometers enough. I never operate a machine with less than four thermometers, and I keep one at the front of the tray and one at the back. You should explore the egg chamber all over before you put your eggs in, and see if there are not any hot places in it; and when you find a hot place you want to get rid of it. If you have a hot back or hot front just tilt the machine a little bit and it will even it up.

Mr. Graham: Suppose it is hot in the centre?

Mr. Nix: When you find the warmest place always keep the thermometer there, and then you are always sure of your temperature. You never injure your eggs until the thermometer rises over 106°. There is a great deal of discussion as to the proper heat for incubation.

Q. You mean 106° on top of the eggs?

A. Yes, some manufacturers advocate a temperature of 107°. I have always used the contact method for a thermometer. Other people use the hang up method. There are three methods: the hang up, the contact with the egg. and then having the bulb in contact with two or three eggs. I believe the best plan is to place the thermometer between the eggs. In operating an incubator, if you only have one thermometer in the machine, do not adjust your regulator until you have put your thermometer on another egg, because the heat in eggs varies.

With regard to turning the eggs, I believe the best method, and one that gives the best results, is what is know as the shuffle method of turning. Shuffling the eggs, I am inclined to believe, with a little exercise in the growing germ, is beneficial to the hatch. The old hen rolls the eggs around in the nest considerably. You only have to lift a few eggs, and then take your fingers and mix the eggs and make a general mix-up. It is not essential that you should turn the egg exactly half over or any particular amount: don't pay any attention to that. Turn them promiscuously, and if you mix them up sufficiently the eggs will be changed.

Some incubator manufacturers do not cool and do not recommend it. I think that is influenced a little bit by the temperature. If you run the incubator at a low temperature you should not cool very much, but if you run it at a high temperature cooling must be practised. I believe better results are obtained by running at a high temperature and cooling considerably. My method of cooling is by the sense of touch and feeling. I do not believe in cooling five minutes or ten minutes or fifteen.

Mr. Graham: Do you cool by the thermometer test?

Mr. Nix: No, I do not believe in that. I believe the best method in cooling is the cooling table, and when you are cooling do not allow the tray to over-hang the table, because if you do the cool air will come up through the eggs and cause a draft. It is not necessary to cool very much the first five days. I would simply turn the eggs, and at the end of the first week commence to cool. I put the palm of my hand on the eggs, and if they feel cool I put them back in the machine. By laying your hand on the egg you can tell if it feels warm or not. I think the incubator operator should go quite a good deal by his physical senses. Use your nose every time you go to the incubator, smell the air in the incubator and you can tell the condition of the eggs by the sense of smell. The time required to cool will vary with the outside temperature.

Mr. Graham: Do you keep the machine door closed when you are cooling?

Mr. Nix: Yes, because when you leave the door open the machine cools down too fast, and then it will take too long to heat it up.

Q. You do not advise opening the machine and letting the eggs cool off in the machine?

A. No, I do not. I believe in the cooling table. A great many operators cool inside the machine, but they do most of their hatching in hot weather.

Q. Do you turn the tray before putting it back?

A. Yes, end for end and side for side.

Q. What conclusion do you come to after shuffling the eggs all around like that?

A. You will find in the general mix-up you will get a more uniform development, and it seldom happens that the eggs will be in the same position.

Q. How about hatching duck eggs?

A. I would start them at 101° and let the temperature come up very slowly. Ten hours or more to 101°. If by 24 hours the temperature is not up to 101° readjust the regulator. I would start the duck at a temperature of 101°, and run it that way for the first four or five days, and then let it gradually come up to 102° and then 103°, until the time of exclusion comes, and then allow it to go up to 104° and 105°.

Q. Would you use any moisture in these machines?

A. We certainly would.

Q. A lot or a little?

A. I would fill the moisture pan with water for ducks eggs.

Q. For these open bottom machines would you have moisture for the hen's eggs?

A. Yes, but I do not think it would make much difference.

Q. Why is a duck egg so hard to hatch?

A. I do not know.

Mr. Graham: I could hatch duck eggs in the east, and when I brought the same machine up here, I could not hatch them so well.

Mr. Hunter: There is a difference in the altitude and the sea air.

The Chairman: Don't you think the humidity of the incubator room ought to be considered?

A. I should think so. These incubators were operated on the Sound. His incubator room has a dirt floor and he dampens it with water. He keeps his floor in a slop.

Q. Does he spray his eggs with an atomizer?

A. Yes. The Curtiss boys and the Long Island people start at 103°, and run at 103° straight through; at least they told me they did. There are three methods of applying water to a duck egg. One with the atomizer, and another is to take an ordinary brush about three or four inches, dip it in warm water, and shake it all you can, and then wipe the eggs all over with the brush. You do not turn the eggs. You practically cover $\frac{3}{4}$ thoroughly with the brush and when you strike the egg with the brush you can see a steam rise. Another method is to use a wet cloth. This is the Moss method. Originally they took cloths, dipped them in water, and then they were spread over the eggs, and the eggs were pushed back into the machine, and the cloth allowed to dry on the eggs, but they found they secured just as good results by leaving the cloth on 15 or 20 minutes, and then removing it. If you use the brush and you find drops of water on the eggs, take the palm of the hand and remove them. Drops of water drying on the eggs are injurious.

Q. Did you ever try that with hen eggs?

A. I never have.

Q. A great many people believe if you take the eggs out and dip them in hot water it is beneficial. A lady told me she took the eggs out and put them in hot water so hot that she could hardly bear her hands in it, it was at a temperature of 125°.

The Chairman: I should say that would be 110°.

A. She dipped these eggs in the water and put them back, and she said she secured wonderful hatches.

Q. Do you do this brushing right from the start?

A. No; after four or five days.

Q. Can you hatch goose eggs in an incubator?

A. Yes; they are making special machines for doing that, and they have secured excellent results at Allantown.

Q. What breed were they?

A. They were geese, and that is all I know.

Q. What is the temperature of the water that you apply with a brush?

A. A temperature of 106°.

Q. What is the idea of making a duck machine bigger than a hen machine?

A. That is to give them a little more room to move around, a little more space for the eggs; that is all. Let them travel around. And I think it is an advantage to have a little more air space in the machine.

Q. Is there an advantage or disadvantage in having a light in the egg chamber?

A. That is a point I cannot speak on. I never allow a direct sunlight to strike the egg, because it will kill the germ.

Q. Would you turn duck eggs the same as hen eggs and just as often?

A. Yes.

Q. How would you build an incubator cellar for twenty machines?

A. I believe in incubator cellars, but I think we get them too deep in the ground. The ideal incubator cellar would be on the side of a hill, where the floor would run on a level with the ground.

Q. How would you ventilate an incubator room at this season of the year?

A. I would open the transom sashes.

Q. Would the top draft of the furnace draw it out if you left the furnace door open?

A. I think it would. I have seen incubator rooms with an open fireplace.

Q. Would not that be a good idea?

A. I think it would be an elegant idea, and Mr. Smith's incubator room at Hanover, Mass., has an open fire-place, and others operate machines in cellars ventilated in the same way.

A Member: The condition we have here is that they do not absorb the yolk?

A. I think that is caused by retarded development. The tendency of the growing germ is to hatch in twenty-one days, and if the air conditions are improper the noxious gases are present and they slow down the vital forces.

Q. In getting eggs for incubation do you believe in turning them?

A. Not necessarily; but it is injurious to pack eggs in musty bran or grain.

Q. What length of time can eggs be kept for incubation purposes?

A. I have kept them four weeks, and had them hatch all right.

Q. Do you mean as well as if they were set the first week?

A. No, because they came from the open range stock out doors. With strong vitality their eggs will keep a great deal longer than where the hens are confined.

Q. What do you call a good average hatch?

A. I am not satisfied with a hatch unless I get 65 chickens from every hundred eggs I put in. I think one of the most important things we have in the poultry business is the two hundred egg hen and greater vitality in our poultry.

Q. Can you put too much air in the machine?

Mr. Graham: We have found that the diffusion type of machine will burn more oil than the radiant type of machine, and necessarily we come to the conclusion that the diffusion type passes much more air through them. Is that harmful?

A. I do not know. There are two things to be taken into consideration in the diffusion incubators. It may be the quantity of air that goes through may be too great, and it may be heated too high, and you have very little difference in temperature between the top and the bottom of the egg.

Q. Can you give us any idea why your machine is so economical in oil?

A. I attribute it to the means we have for circulating the air. The modern way of heating buildings is by what they call the hot blast system by means of blowers; to secure the same results with direct radiation in the room requires from five to seven times the radiation, and to use indirect radiation it takes fourteen times as much radiation.

Q. How do you account for blood-rings?

A. One cause is shock.

Q. Would you prefer a room like this to an incubator room or one 4½ feet in the ground?

A. That depends on the condition. If I do not have too many incubators, I would prefer the underground room, and if I had a great many I would prefer this upper room.

Q. How many machines would you have in this room?

A. I would have it plump full, and then put cotton curtains in the top of the window, and open the windows from the top.

Q. Can you tell us the exact quantity of air required for incubation?

A. I could not tell you.

Q. How much air does an ordinary kerosene lamp burn in twenty-four hours?

A. I never went into that.

The Chairman: A kerosene lamp consuming 909 grains of oil, removes 5.9 per cent of oxygen and produces 4.1 carbon dioxide, and the vitiation of the air is equal to seven adults, according to Hygiene and Sanitation (Egbert). When you are using a lamp test you are always guessing at results. The best method for testing eggs is to put them in the direct sunlight. Use a dark, or better, a small booth near the window and enclose it with black curtains and have the aperture in the window the size of the egg. You can curtain the window with black oil-cloth or black cloth and have the hole in it about one inch, in time you can hold the eggs in the sunlight and in the second stage you can see the germ and there is no guesswork about it, you can actually see the blood-veins.

Q. What about electric light?

A. I never tried electric light, but this winter I used acetylene lamps, and acetylene is the nearest to sunlight.

Mr. Hunter: In the Aylesbury duck district in England I found a very interesting thing. A man and his father before him were practising it. They first took the eggs and put them in incubators for twenty-four hours, and then they would test them and see if the germ had started, and then the eggs were laid aside until he was going down to one of his farms. He might keep them three or four days, and in that way he only put out on his farms eggs that had strong germs and he got almost one hundred per cent hatches.

Mr. Graham: Do you mean to say he incubated them twenty-four hours and then took them out?

A. Yes; he did that, and his father before him had done it for over forty years.

Q. At what point will the germ in an egg begin to develop?

The Chairman: It will begin at 95°. Prof. Edwards, of Harvard University, carried on a number of experiments along this line. He tried to find out the problem of how low a temperature would be necessary to start life in an egg. It is what they call the physiological zero, and they found out it was about 70 degrees. They did not find out that the germ would develop at 70 degrees.

Mr. Hunter: Shippers of eggs from Chicago to Boston have found that when they received the eggs in Boston (one shipment I know of in particular) that all of them were bad, and I think it was accounted for by the fact that the germ had started on account of the extremely hot weather during the trip.

The Chairman: I have noted a few points of importance for us to consider during the meeting: first, the advantage of trap nests for vitality, increase in the hatchability of our eggs. Keep the eggs as much as possible in a uniform position towards the thermostat. It is a relief to know that the eggs are not injured until the temperature goes over 106°, although it is not advisable to hold them at that temperature. Do not cool the eggs so much when the incubator is running at a low temperature, but cool them down when you are running the incubator at a high temperature. Testing in the sunlight is more effective than testing by lamp light. The lowest point at which the germ in an egg will start is 70 degrees, and that impresses me with the fact that we ought to have only unfertile eggs for domestic purposes.

CAPONS AND SOFT ROASTERS.

By A. F. Hunter, West Roxbury, Mass.

I am surprised to find that you do not know very much about this subject in Canada. I will give you a definition of a "soft roaster." We begin marketing the chickens in the United States when they weigh three-quarters of a pound; we call them "squab broilers." They make a very tender little mouthful, and the rich people are glad to pay a big price for them. Many of our poultry men market thousands of these birds.

Q. At what age?

A. A great deal depends on the variety. You can grow a Plymouth Rock quicker than you can a Leghorn. One man over there markets all his Leghorns as "squabs" at five to seven weeks old. He sells them when they get the right size regardless of the age.

The next grade are simply called "broilers" and weigh from one and a half to two and a half pounds each, and here we run upon the age of the soft roaster. These soft broilers weighing two and a half pounds are usually cooked as roasters, and are served half a chicken in the swell restaurants and hotels. If you go to the market and ask for a small soft roaster you will get a three and a half or four pound chicken. The soft roasters are mostly in demand in the spring, when they weigh from three and a half to four pounds apiece, but as the season advances they will weigh from seven to nine pounds apiece. Then there comes the intermediate period when in certain of our markets you will find a very large soft roaster. I have seen in the city of New York capons sold as soft roasters. A customer will come in and order a large soft roaster, and they take a capon and strip the wing and neck feathers off and then it is a roaster. At the Main State show Professor Graham saw roasters that weighed ten and a half pounds, dressed. This was a cross of a Barred Plymouth Rock and Light Brahma, and it was not a capon. A soft roaster breeder begins hatching his chickens in September or October, and they are almost invariably Light Brahmas; not exhibition Brahmas, but farmers' Brahmas, a little lighter boned than the exhibition birds. Mr. Curtiss, who handles hundreds of tons of these birds, tells me that the Plymouth Rock is coming into use in that section. He says the White Plymouth Rock is today the best all round variety of fowl in the world. I believe the White Wyandotte is superior to the White Plymouth Rock, but where a large bird is the *sine qua non* the Plymouth Rock is the best.

THE CHAIRMAN: Do you think it will weigh more when it is three months old?

A. Yes, I think it will at three months of age be heavier than the White Wyandotte, but the White Wyandotte is the better chicken because an undue proportion of the Rock is frame and bones. I do not eat bones, and I do not want to pay for bones. You get a rounder, plumper carcass and a better covered breast in the White Wyandotte and a shorter leg.

MR. GRAHAM: If you were producing five and a half pound roasters such as we produce in quantities in this country, would you advise us to caponize the birds?

A. I would.

Q. For what reason?

A. You will get your five and a half pounds easier and a little quicker, and you will get a better quality of flesh, but you will have to educate your market men to appreciate that.

Q. Supposing they were the same price per pound, capons and cockerels, would we get enough extra flesh for every pound of grain fed to pay us for our trouble?

A. A great deal depends on the individuality of your birds.

Q. Do you think that would be safe for experimental work?

A. I think it would be wise to do it.

Q. Do you think for the fattening crate the capon would be more contented than the cockerel?

A. I think it would, and perhaps you would avoid the trouble of crate fattening, which is somewhat laborious.

Q. What is the percentage of mortality from caponizing?

A. The mortality from the operation with expert caponizing is small; they expect about five per cent; the green hand will perhaps kill twenty-five per cent., but they are not lost, you can eat them as broilers.

Q. Is it a fact that children are allowed to do it in France?

A. It is so simple that anyone can do it, but the only way you can become expert is by practice.

Q. At what age do you do it?

A. When they weigh from two and a half to three pounds.

Q. Would you caponize a White Wyandotte earlier than a Plymouth Rock?

A. Both about the same—when two and a half to three pounds. The capon has naturally a quiet disposition, and has nothing to do but to accumulate flesh. He lives up to the popular maxim, "Let us eat and drink, for tomorrow we die."

The CHAIRMAN: A soft roaster weighing two and a half pounds, what does it sell for on the Boston market?

A. About thirty cents a pound; that would be the wholesale price.

Q. The capon that weighs five pounds, what would it sell for?

A. It would depend on the season. Birds that weigh five pounds a pair in April would weigh five pounds each in August. If I had capons in August I would carry them along until autumn, when I could get a better price. There is very little call for capons in August. Capons are most saleable in March and April.

Q. Do you think we could make a success in this country of hatching chickens in October?

A. I do not see why you could not. New Jersey soft roasters are called Philadelphia chicken.

Q. Is there any appreciable quantity of soft roasters or capons sent from the United States market to the Canadian market?

A. I am not informed on that point, but I saw a report of twenty car loads of dressed poultry that were sent from Chicago to Liverpool.

Mr. GRAHAM: They inform me they can tell whether a chicken has been crate fed or not merely by putting their hand on it?

Mr. HUNTER: If a man said that to me I would tell him I loved a liar, because I lied sometimes myself.

Q. How many do they put in a house together?

A. They put forty birds in a house seven by twenty with a yard ten by fifteen. They show more average gain fed in pens than fed in crates.

Mr. GRAHAM: It depends on the man who is feeding. I have had nine men feeding chickens since taking the management here. One man was an absolute failure, but one man, who is down stairs now, can make a chicken in a loose pen gain as many pounds as he can in a crate; yet at the same time he says he would rather feed them in a crate. The man who is inclined to be the least bit careless would do better work crate feeding than loose feeding. If a man gets it into his head that he would get better results I would say let him feed that way.

Q. Do not crate fed birds fatten more evenly than pen fed?

A. I think a great deal depends on the individuality of the birds. I have seen crate fattened chickens where one would come out of the crate in an unfattened condition. Some birds seem to be averse to eating a fattening ration, and when they get them that way they take them out and give them a run in the fields and then put them up in the crate again. If a bird will not accumulate fat during the first ten days it is shut up in the crate it is very much wiser to take it out. When you put them in the crate you should starve them for the first day or so.

A MEMBER: If you change the ration, sometimes they will eat so much that they will stall themselves, and I have had a lot that way; but where I exercise care in the first three feeds I do not have any trouble.

Mr. GRAHAM: We have here a number of men who have been crate feeding from five hundred to one thousand birds.

Mr. FRED C. ELFORD, Chief of the Poultry Division, Ottawa: I have not had the advantage of listening to your addresses so far, but I will be pleased to tell what I saw at Mr. Adam Armstrong's in Fergus. I have heard some people say that a chicken fed in a stall has just as good a quality of flesh as a chicken fed in a crate, and any person who will take the time to go to Mr. Armstrong's establishment when it is in full swing will come away with his ideas changed in that matter. Mr. Armstrong has been operating this plant for about seven years, and his system is simply this: In the first place he puts the crates out among the farmers and says to them, "If you will fatten your birds in the crate you can pay for that crate as you bring your birds in; you can give me the extra amount you get for your chickens when they are fat, and in time you will pay for that crate; or I can take the price from your first shipment." Ninety-five per cent. of his birds are fed in crates and five per cent. are fed in pens, and he can go through the whole lot and pick out every bird that was fed in the pens, and so you could after you see him do it. When you see the finish of the flesh and the style of the bird there is no comparison between the two. The crate fed bird had a better appearance, it was not a flabby fat, but it had nice solid flesh.

Q. You mean, by feeding in the crate the fat and lean are intermixed more than fed in the pen?

Mr. Elford: The fat is put on more evenly. Mr. Armstrong claimed that the farmers who adopted the crate feeding system would not think of going back to the pen feeding system. There is a great deal in the individuality of the bird. You can take some birds and put them in a crate and feed them three times a day and you will lose money on them, and other birds you can feed five days or five weeks and still make a profit. It is foolish to take one hundred birds and put them in crates, and then take them out and kill and sell them at the same time. Some birds are ready in ten days, and some birds after they are fed two weeks will commence to go back.

Q. What do you do with a bird that is going back?

A. Sometimes turn it out and sometimes give it a little stock food. I have seen stock food in just such cases as that give good results; it acts as a stimulant and carries them over.

Mr. A. P. Hillhouse, Bondville, Que.: I think Mr. Elford has covered the whole ground. I prefer to feed them in the crates for the same reason given by Mr. Elford. We can put up a great deal better bird under the crate system than under the pen system. It is cheaper, and they are more easily kept. A man handling one thousand birds could do it much easier in the crates than in the pens.

Q. What is the percentage of mortality?

A. The mortality is very slight if you have good birds to start with. You very seldom lose a bird in a crate or in a pen.

Brother Liguori, La Trappe, Que.: I have found the same thing as Mr. Elford, that the best way to feed is under the crate system.

Mr. Geo. Swallow, Holmesville: Farmers who have adopted this system say they would not think of killing a bird for their own use without putting it in a crate and fattening it. I think it is the same with a bird or a chicken or any animal, a hog or a cow or a horse. You can take two cows or two hogs and they will not feed exactly alike. This fall I put seventy-five birds that were two or three months old into crates and they were ready to kill at four weeks. The first shipment out of the seventy-five birds was forty-eight birds. You cannot fatten them in any stated time. One bird will take longer than another, and you have to use judgment and understand what you are doing in order to make a success of the business.

Mr. J. W. Clark, Cainsville: I prefer crate feeding. I think it is a long way ahead of pen feeding. In the first place with the crate you can select your individual birds and put them together, and feed them accordingly and the sanitary conditions are much better. In a pen you will always find some birds who want to be boss, and they knock the others around.

Mr. J. R. Terry, Guelph: I would sooner feed them in crates, because you can do it much easier. If I had to feed one thousand I would feed them in crates. Where you have them in a pen the bird is all over the place, and it is very hard to keep them clean, and then you would have so many doors to open and shut when you are feeding them; but when they are in crates you can have them all around the room and feeding them is a great deal less trouble.

Mr. J. J. Riley, Montreal, Que.: I think the labor is much less feeding them in crates than under the pen system. We feed large quantities of skim milk, and when you have them in crates you can feed a lot of birds in a small space and keep them cleaner with less labor.

Mr. Graham: Six years ago, when we started crate feeding we could not sell our best birds for more than ten cents a pound; now we can sell them for fifteen cents, and I think that is a practical test. For the purpose of producing white flesh we fed oats, buckwheat and skim milk, and to produce yellow flesh we fed boiled pumpkins, turnips and yellow corn. I had to get up a demonstration for the Winter Fair, and I tried feeding pumpkins and yellow corn and cotton seed meal, and I found it absolutely necessary to cut out the milk.

Mr. Hunter: If you want to produce a fine texture of skin there is no doubt skim milk is a most important food element. Skim milk gives them a feeling just like a new kid glove. I understand from what you say there is no caponizing done here at all.

Mr. Graham: I do not believe there are one thousand capons in the Dominion of Canada.

A Member: There is no need for it.

Mr. Hunter: That is a surprise for me, as there is so much of it done in our country. In the soft roaster region down in the south shore, where they raise thousands and thousands of them, they are caponized, and I would advise that the Ontario Experimental Station at Guelph do some caponizing and test it. Mr. Griner's book explains the method.

A Member: Does not it take considerably longer time to develop the bird?

Mr. Graham: I do not think there is very much difference.

Mr. Foley: There would not be very much advantage in doing it unless we could get a market for our birds.

Mr. Hunter: A lady asked me as to what price she should get for these birds, and I told her to ask five cents a pound above the price for the ordinary chicken, and after a year or two the demand would increase.

THE EVOLUTION OF THE POULTRY HOUSE.

By Prof. Jas. Rice, Cornell University, Ithaca, N.Y.

I must confess that I came up here with a selfish motive of getting more out of it than I give in; not that I would not be willing to give all I could, but I feel that I could learn more than I could possibly tell you. I have learned a great deal already, and have got two or three thoughts that have been brand new. I want to thank Mr. Graham for calling out this experience for you from practical feeders. We have not been doing it so extensively, yet we already have three cramming machines at the University of three different types, and we are going to put our students through the process. We are trying a little experiment, and I will take up my topic with the lantern slides. We are running a fattening experiment at the University more for the sake of a principle than a practical one. Our professors want to know what the effect of sugar or sweetening material of any kind would have in the fattening of fowls or any other live stock, and we are carrying out an experiment for them. I cannot give the results because it has only been running for a week. We feed them in little pens something like yours, and they eat what they wish three times a day. We feed them all the same ration, except one pen, and they get a little molasses in the ration, enough to mix it up. The chickens eat it ravenously, more so than the other rations, and they make more rapid growth. We are feeding a run of corn meal and wheat middlings very largely and we use milk and molasses.

Q. What does that molasses cost?

A. We have not made any practical test of that. We just send to the grocery store and ask for the cheapest molasses they have, and if it turns out that there is any practical value in it then we are going right at it and find out whether or not we could make a practical application of it.

Q. What proportion are you using?

A. We simply mix up the molasses with it, and it makes them eat more of it.

A Member: There is a lot of molasses used in this country in feeding cattle.

Prof. Rice: They are making such good gain that it seems there might be something of practical value in it. We do not know very much about the hen's digestion, and we have to assume that it is something the same as other animals. We are teaching the value of nutritive rations, to show how radically different corn meal is from pea meal, how different gluten meal is from buckwheat meal, and how similar alfalfa meal is to wheat bran, and it will show that in wheat screenings the actual amount of protein it contains is almost identical with that of clear wheat and has less starchy matter in it, and it is nearer a ration than wheat. Dr. Wheeler has figured it out more carefully than anyone else as to how much protein a flock of hens ought to have, and how much carbohydrate, and you could teach that to your class; but if you were to weigh up the different flocks of each herd and figure out just how much they weigh and feed them rations and give them the same amount of dry matter and the same amount of protein, carbohydrates, etc., some of them would not get enough and some would get too much;—the reason being that we have entirely different combinations to deal with. What would apply to one individual to-day would not apply in a month or two. In other words, hens laying rapidly will eat more food than when they are not laying rapidly. We balance our rations so as to give our students a general idea of what they ought to have, but at the same time actual practice tells us that some of the hens do not get enough by that experiment, and some of them get more than they can pick up. The actual science of feeding is to use good judgment, and the feeder should know his animals and know what they can eat. I was asked yesterday for my opinion of the wet and dry mash, and I said that I preferred to withhold judgment. I meant that in this way: we as poultrymen are apt to go to extremes when some new idea comes up. We jump at conclusions. I feel that the subject of dry feeding has got more of merit in it than any new idea that has come up in recent years, and yet there are a lot of things that will probably occur in the next few years as to its effect on vitality, and perhaps there will be a modification of this method of dry feeding, and as to whether or not it is advisable to feed some boiled vegetables with liquid juice from meat. We have tried three pens of White Leghorns. We knew the strains, and we divided them equally among three pens, and we fed them on the same kind of grain and the same amount of soft feed. The soft ration was made up of wheat bran, corn meal, and meat scraps, and wheat middlings about equal parts, and the grain ration was for part of the time wheat and oats, with a little corn and the rest of the time equal parts. Whatever applies to one pen applies to the other three. The experiment has been running now about nine months, and the result is that the first pen, which was fed the whole grain in the litter morning and night with a soft mash feed at noon mixed up with water, led the procession in egg production for the first five months right straight through. My heart went down, because I must tell you that although we were after the truth, and did not care where the lightning struck, yet I had a personal feeling, and I hoped that the easier way of putting the feed out in the hopper and just opening it up once a day or leaving it open all the while would have the best results. The second pen got their grain morning and night just the same as the first pen, but they got their soft feed in the hopper in the afternoon every hour or two, and the third pen we fed with the whole grain in the morning and whole grain in the hopper day and night right straight through. The pen that had the hopper open all the while gave us better results, but at the end of the five months the dry feed pens began to pick up just about moulting time. The hens that had soft mash did not moult for four to six weeks, and then when the cold weather struck it put them nearly out of business, and the two dry feed pens have been ahead ever since. What the result will be at the end of twelve months I do not know. I think we can afford to take a few less eggs, because it saves a lot of labor, and the only question is whether it will keep up the vitality. We can afford to sacrifice almost everything before sacrificing that. Vitality is the beginning and end of the whole business. If we once lose vitality it will commence getting worse year after year.

Mr. Elford: Do you think it would be a good thing for a person at this time of the year to change the system of feeding?

A. It seems to me to be the best time of the year, because now is the time that the hen's body responds to climatic conditions. I know the hens do no take to the dry feed kindly, and it seems to me there are a lot of problems involved in that dry feeding. A man who feeds all whole grain is asking his hens to do too much, and a man who feeds all ground feed in a soft mash is running the risk of impairing the digestion. One of the most convincing things is expressed by C. H. Wycoff of Aurora, N.Y. He is the most successful feeder I have ever met. I have known him for the last ten or fifteen years, and have been personally at his home for years, and I have more confidence in his practical judgment than that of any person that I know of. He has been feeding his hens for the last two years for egg production by the dry feeding method, and he has had success, and his hens are in perfect condition of health.

Q. What kind of houses has he?

A. They are built infinitely more expensive than they should be. They cost him about six or seven dollars for each hen's capacity. He says he would not build them like that again. He keeps his windows open a few inches from the top during the entire year. His houses are tight on every side including the two ends, and open to the south, and, like a bottle, you cannot get any draft in it.

With regard to the grit fed to hens, I may say that this opens a very interesting field. It has been said that the grit itself has only one function and that is to furnish mineral matter, and that it is not used for grinding food, and that it has absolutely nothing to do with the grinding process. I have been following the discussion quite closely, and I feel that the first thing we ought to do is to get some facts. I believe the grit loosens up the grain in the crop and helps to work the juices together, whether you call that grinding or not. Whether they get any mineral matter out of it is questionable. We took twenty White Leghorn cockerels and divided them into four flocks and put them into separate pens and we did not give any of them a bit of grit to eat for one week, but we allowed them to eat grain and all they wanted of it. We fed them two or three times a day both on hard and soft feed, and at the end of that week we took the first pen and gave them what grit they could eat, and they have had all they wanted ever since. The pen right opposite to them did not get any grit at all, but we waited until we saw what the first pen ate, and then we put that much grit into a grinding mill and ground it just as fine as flour so that they would get all the mineral matter that was in it, but they did not get any grinding material. We fed that to that pen, and then the next pen we gave them neither the grit nor the meal nor the ground grit; and the fourth pen we put them off by themselves and gave them all the grit they could possibly eat and then took it away from them. We kept that fourth pen just to die for their country, and at the end of three weeks we killed one of them and we took out the grit that was in the crop, washed it off clean, and put it in a bottle and weighed it, and there was actually more grit in the bottle than the fowl had eaten at the end of that first week. The grit had been there before; gravel and stones and pieces of coal. At the end of four or five weeks we killed another one, and there was more grit left in the gizzard than the fowl had eaten at the time we filled it up. and we waited five or six weeks and killed another and there was still more grit in the gizzard than there was at the time we started to feed them. We have two left, and we do not know when to kill them. Some of these little pebbles were just as smooth and round as they could be, for they have been rolled over and over so many times. So far as the actual results in the vitality and growth is concerned, the ones that had the grit by them all the time where they could help hemselves have done better than the others; but the difference is not so marked as I thought it was going to be. There are some individuals in the pen that have not had grit nor the mineral matter ground up for them, that are just as bright and husky as those that had the mineral matter and the grit. You can learn more from pullets than you can from cockerels, so we put some late hatched Plymouth Rock pullets in one of these colony houses, and another bunch in a similar house, and we feed them the same way, except one of them has got grit all the while, and the other gets powder grit all the while; and as yet we have not seen any marked difference as to their health or condition. We find that the hens are not laying many eggs, they eat about equal parts of the grit and cracked oyster shell, a little more oyster as a rule; and when they are laying rapidly they will eat two or three times as much, which would indicate to me that the hen naturally feels that she needs it.

The Chairman: Do you ever find that for a time they will eat more crystal grit than oyster shell. Then at other times they will eat more oyster shells than crystal grit.

A. Yes, I have had correspondents write me to that effect.

A Member: I fed about two pounds of grit in a month to ten birds.

Another Member: I have seen a flock of birds in the West that never got any grit.

Prof. Rice: There is no question but what fowls can get along without it: the action of the gizzard is partly digestive. The stomach proper is full of glands, and inside the gizzard you can see the glands there that secrete that material. I feel that newly hatched chicks ought to have grit, and I always get a little fine grit, because they take it more rapidly than they will the other kind.

Q. Is there any danger of them eating too much or filling themselves up with sand?

A. I never saw them do that, but I have seen sick chickens hunting for something all the time, and they will sometimes eat too much.

Mr. F. W. Krouse, Guelph: My chickens run in with the bees and run after flies, but will not touch the bee even right at the start when they are right out of the egg.

THE IMPORTANCE OF GREEN FOOD FOR FOWLS.

By Prof. Rice, Cornell University, Ithaca, N.Y.

We have heard a great deal of alfalfa, and in our country we have come to believe that it is the most profitable plant we can grow for forage crop, and we have also learned that the hens love it, and that they need a vegetable food of some sort. The question of labor also is coming in so very seriously, and we feel that anything we can do to eliminate that labor problem is a decided advantage. So the question arises as to whether we can afford to pasture the hens, and to make a test we seeded down a little piece of alfalfa in a field, and used it for pasture the next year. We divided up four flocks, and we put one flock on a yard with absolutely not a speck of grass in it, and the other flocks were let run out into the field of alfalfa; and in order to take our results we duplicated the experiment, one flock on the bare yard and the other on the alfalfa pasture, and kept account of the eggs that were laid, the condition of health, etc. We carried that right on through the summer, and this spring we are going to turn them on to this alfalfa again. The conclusion we came to was that what was true of one flock was true of the other. They gave us better results on the alfalfa.

Q. In your estimation is alfalfa better for a hen than what we call blue grass?

A. I do not know which will stand the tramp of the hens better. Alfalfa has this advantage, that it is a legume, and that it gives you a food that is rich in nitrogen, and we feel that we can get something that will enrich our land and that it will be an advantage.

Mr. Elford: I think alfalfa is the best thing you can give a cow or a chicken. The alfalfa keeps growing up as fast as they eat it off. We had over 50 hens on a piece of ground not as large as this room, and they could not begin to eat it down. As a matter of fact the hens ate more grain on that alfalfa than the others did, but they were laying more eggs and the eggs did not cost us as much.

Q. What about fertility?

A. I do not know yet; we had not started our experiment in time. The alfalfa pen laid a little longer, and did not moult so soon.

Q. When they did moult, did they grow their feathers fast?

A. Yes; they came out in a nice satisfactory shape. If you can get good alfalfa meal it is a magnificent food. I believe we will find it more profitable than wheat bran. I got a letter from a man in our State saying that a person was selling alfalfa meal for $2.25 per hundred, and he was guaranteeing 50 per cent. of protein, and he sent a sample to us asking us if it would be wise for him to buy it. I wrote back immediately: "Do not buy it, and do not let your neighbors buy it, until we get an analysis." Our chemist found there was not 9 per cent. of actual protein in the whole thing; there was 35 per cent. of fibre, and it was better for stuffing a bed than a hen. We have been experimenting on this subject, and we have been feeding flocks of hens down there, feeding each flock alike, except that one flock is being fed on one kind of alfalfa meal and another flock on another brand of alfalfa meal, and we are actually losing money on some of these pens, and making a fine profit on other pens, and this is due to the quality of the alfalfa. Wherever you get anything that is choice and go and put it on the market, whether it is incubators or anything else, there are thousands of people willing to rush in on that same current and put on impositions.

Mr. Davis: I got a bag of alfalfa meal and fed it to one of the pens, and they were all sick.

Prof. Rice: That is the trouble. They leave the alfalfa till it is too old, and it is not cured properly, and it gets musty.

Mr. Davis: It seemed to give them diarrhœa.

Prof. Rice: That was because it was musty. If you grow alfalfa you can raise from three to five tons to the acre. It is worth as much or more than ordinary clover, and is worth almost as much as ordinary wheat bran.

Q. Supposing you had a choice between mangels and alfalfa?

A. I do not believe you can compare them at all. I believe you need them both. Alfalfa contains from about nine to ten per cent. protein.

Q. How would you recommend feeding clover?

A. Steam it or dampen it with water, and let it swell, and the hens will take it down quite readily.

Q. You would not mix chop with it?

A. Yes; that is a very good way to feed soft food. Mr. Wycoff has absolutely dropped out all of his wheat bran. You can feed a hen or a cow a scoop full of alfalfa and it will not hurt it.

Q. What would you recommend growing in an orchard as green food for hens?

A. We have a plum orchard, and we set it out to Japanese plums and cultivated them for two years thoroughly in order to get a good growth on them, and then we seeded it down to red clover, and ever since that time we have been pasturing the hens on clover and the plum orchard for the last five or six years has produced from twelve to eighteen hundred chickens each year in addition to the crop of plums.

Q. You would not recommend sowing alfalfa with the plums?

A. No, because it is a deep rooted plant. I know one field of alfalfa that has been in for twenty years. We have taken an incubator record for two or three years in order to find out what happened to the eggs that came from certain hens. We keep a record of the hens during the breeding season, and I asked Mr. Halpin, one of our students, if he would go through a lot of our records and take out certain individuals and follow them all the way through. He took a pen of Barred Plymouth Rocks that were in the same house, and were only divided from the others by a wire netting, and they were fed on a similar ration, and they were all alike in appearance. He found that one incubator had so many of those hens' eggs and another had another lot, and so on. He traced the eggs of one Plymouth Rock in pen No. 1 all the way through from away back early in March, and some of her eggs were in every week or two until away about the first of July, and the striking thing was that every egg that hen laid all that time they went into these machines hatched a healthy chicken. We found, in the case of a good many other hens, that almost every egg they laid for that entire time gave us a chicken; and we also found in that same pen one hen that during the entire time had laid about as many eggs, and had about as many go into the machine, yet did not have a single fertile egg to her credit. We found in the case of other hens in the same flock that although their eggs were fertile the germs were dead or were weak all the way through, and other hens' eggs would occasionally hatch and die in the shell. In other words, the question of fertility applies to all flocks of hens. In some cases certain individuals are to blame for the trouble. We had one small incubator which held fifty eggs, and we found that the eggs from two hens in that incubator had all hatched, and none of the others did. We are going to trap nest a flock of hens, and we are going to incubate every one of them to see if the hens will give us fertile eggs for a certain number of months and then stop. I think that is a question we will have to consider in the future. We must do our mating and brooding to that end. If you look over the history of the men who have failed in the poultry business you will find that they could not renew the flock because they lost fertility. We cannot afford to try and raise crippled chickens. We cannot afford to let the weak ones live in the flock, and I tell our people day after day to pick out the best birds and breed from them, and by doing that you will hatch a great many more chickens and will be able to raise every one of them. Many a man has started out with a good fine lot of eggs and they have lost fertility through want of care, and that is a serious question. We have tried to find how long you could keep an egg before setting it. We have not found much difference in an egg kept for a week, but if you keep it for two weeks you will lose in fertility; we weaken the fertility by holding the eggs. We have a reading course of lessons that we send to eighteen or nineteen hundred people, and they are supposed to send in answers to questions, and I ask them in every one of their examinations, because I would like to know these questions: "What in your experience has given you the best results, natural incubation or artificial incubation?" "Have you in your experience seen any difference in regard to fertility hatched with the natural or artificial method?" I asked one of our students to take all of those answers, about 200 of them, and classify them, and there was more than a majority who said that they had got better results from artificial incubation than natural incubation, and they said that they had not seen any decrease in fertility from the incubator hatched chickens. So far as my own experience is concerned on our own farm at Yorktown, we have not hatched a chicken by the natural way in the last ten or twelve years, except two summers ago, when we had a German working there, and he hatched some chickens by the natural method, and did not tell us about it, but he did not have very good results.

Q. Have you had white diarrhœa on your place?

A. Yes; but do not ask me any questions about it, for I absolutely do not know anything about it.

Q. Have you got rid of it?

A. Yes; we started out to have just three hatches of chickens, put 1,200 eggs in each hatch, and we raised 2,000 chicks, and did not have any experience with the white diarrhœa. But if we run four or five hatches from the same eggs with the same lot of hens we will have white diarrhœa. I have gone to our bacteriologist and physiologist, and I am going to try the penologist next. (Laughter.) I do not know what causes it, whether it is the incubator, or brooder, or the feeding.

Q. Did you ever see any of it from hen-hatched chickens?

A. I do not recollect that I have.

Mr. Graham: I cannot recall a man who has ever seen a hen-hatched chicken affected with it.

Mr. Dawson: Mrs. Robinson had a hen with chickens and they all had it, and she came over to me and asked me what to give them to stop it, and I gave them Dr. Fowler's Wild Strawberry, and they are all living.

Prof. Rice: We started our incubator for the fourth hatch last year, and although we had a good hatch we did not raise more than fifty out of the twelve hundred eggs set. I think the foul air has a good deal to do with it, because we get worse air in the incubator at that season of the year. It may be a lack of oxygen. We have muslin curtains on our windows in the incubator cellar and the windows are open all the time. The little chickens need the fresh air. The hen's temperature is 106, and I think the incubator needs more ventilation. One of the machines that is most popular on the market to-day for hatching chickens is a total failure with ducks because it has not got enough air in it, and one that has been most popular in hatching ducks is one that the air just floats up out of it. Have you ever sat down by a coal stove to read? You are doubled up in a rocking chair where you are doing the least possible amount of exercise, and have the least possible circulation of blood, and you are sure to have the inclination to shake down the stove, because you feel cold; and then if you get up and go out for a walk and come in again you will ask the women how they can possibly live in such an oven and you insist on them throwing open the window and you take off your coat, because you have been warmed up by walking in the fresh air outside. I think the reason you Canadians have so much push and vigor is that you have so much oxygen and ozone in the air. Cold air has got more oxygen per cubic foot than warm air. That is a statement from a scientific magazine, and we want that fresh air for our chickens in the hen house, in the brooders and the incubators. Ten or twelve years ago we were nearly driven out of the business at home. The roup got in, and we tried the fresh air treatment, and it had a marvellous effect; and now every one of the hens are living in houses where they have plenty of fresh air. They are using cloth to keep out the snow, and roup is practically unknown, and I believe it is the best plan to give hens pure fresh air with wholesome food. (Applause.)

The Chairman: We had a most practical discussion and instruction from the two gentlemen who have spoken to us this afternoon, and I think we will all be benefited by it. I will not take time to enlarge on the subject. I see a difficulty with capons and soft roasters on the Toronto market. When my chickens weigh two and a half pounds in the spring I get 40 cents a pound for them, and I do not think it would pay to make capons out of them. Caponizing has a beneficial effect in the quality of the flesh, but the question is whether it pays us for the trouble and the time we have to spend on the operation.

WHY POULTRY PLANTS FAIL.

By A. F. Hunter, West Roxbury, Mass.

It needs but a few words to tell you why poultry plants fail. It is the fault of the man or woman who is running the plant. I think we have had enough in the last two days about successful poultry plants, and the methods employed in making them a success, to show us that where there is a failure it is the fault of the man who is managing the farm and not the fault of the poultry business. There are, it is true, a good many collateral aids and methods which he employs in producing his failure. One of these is probably a poor poultry house. I visited a poultry plant not many weeks ago in which the proprietor has been quite successful, and he is beginning to talk about going to California. He got tired of operating his plant, and is desirous of unloading it upon some easy mark.

There are some who fail from lack of capital, and that is a very common cause of failure. They start out with very large ideas of what they are going to do, and get an idea of the great profits with very little work. With a few hundred dollars in hand they retire from their clerkship and start a poultry farm, and they invest all their money in two or three buildings, and have no income, and the first thing they know they have not any money left. They have exhausted their credit, they cannot make both ends meet, and they fail.

Another very common cause of failure is ignorance. We all know the maxim "Fools rush in where angels fear to tread," and certainly amateurs in the poultry business rush in where we, who have had much observation, would not think of treading.

Another very common cause of failure is weak stock. We have heard some very interesting talk this afternoon about the vitality of stock, and the need of culling out the weaklings, and an instance comes to my mind now of a letter sent to me by Prof. C. K. Graham, a brother of your Professor here. It describes a disease that had broken out in a poultry yard owned by a German. I thought it was consumption. It might have been aggravated by scrofula. I sent the letter on to a medical friend of mine, who immediately pronounced it consumption. Prof. Graham was instructed to visit the man and investigate the matter, and that is a step, I am glad to say, that is being taken in many instances. The President of the College has told Prof. Graham to go and find out what was the trouble. They want to help these men as much as they can, and Prof. Graham immediately went and made an investigation. He visited this poultryman, who had some very choice stock of Silver Laced Wyandottes. He had won quite a number of ribbons, but he had lost in vitality of his birds, and his stock was dying, simply for want of strength and vigor. Consumption had broken out in it, and, as Prof. Graham said, all the stock left on his place was not worth the powder to blow it up. He had told him that he had better kill a cockerel that he had examined, but the man said: "Oh, no, he has a very fine feather," and he could not be convinced that he was up against one of the most serious problems in the business. He had simply run his stock into the ground by breeding for a very fine feather—breeding with the glamor of the blue ribbon dangling before his eyes—and had entirely thrown away the natural vigor possessed by the stock, and that I think has been the cause of the enormous number of failures in the poultry business. I will say without fear of contradiction that is the cause of much of the debility, and at the cost of a great many dollars. People buy birds at shows thinking they will make good breeding birds.

Mr. Graham: You would not say all exhibition birds are not strong?

Mr. Hunter: No; there are some that are strong; but as a rule a great deal of show stock is debilitated by the shows and by the stimulating food that is fed to them to get them in show condition. Down in the States we have an English firm that coop most of our large shows, and they feed a highly stimulating food, and some of our breeders are so disgusted with the effect upon the birds being over stimulated that they are going to complain. I have seen some birds taken out of the show coops dead from the over stimulating food. Some poultrymen will inbreed generation after generation, and build up his stock by doing it, but three out of the five will lower it. I have had twenty years' experience of observation in this line, and I have seen it again and again that men have gradually weakened their birds until finally the stock is almost completely run out, and I look upon this inbreeding and overwrought show system as one potent cause of the disappointment and failure in the poultry business.

We have an example in New England of the failure of the turkey business which was largely due to the stupidity of the turkey growers, who wanted to get higher prices for the best matured birds at Thanksgiving time. We make Thanksgiving one of the principal holidays of the year, pay a high price for turkeys at that time, and consequently kill all the best birds for Thanksgiving, and a little later they kill the next best birds for the Christmas market, and then what were left, which would be the smallest birds of the flock, would be retained for the next year's breeding. You can easily see what the ultimate result would be, and now we are sending to the west for carload after carload of turkeys for Thanksgiving. Vermin have also helped to put the poultryman out of business.

Mr. Graham: Would you say to breed from the best birds regardless of relationship. Suppose the best bird happened to be a brother?

Mr Hunter: No; I would not. I would want to be three-quarters away if possible. That is a matter for careful experiment, a great deal would depend upon the vigor of both.

The Chairman: Have not experiments been made of very close inbreeding without debilitating?

Mr. Hunter: Yes; without any immediate debility. Mr. Pigtmire tells in one of his books of a Black Spanish pullet exhibited in London. It was a wonderfully beautiful bird, so beautiful that it was a marvel to everyone, and yet it never produced an egg.

A Member: I have inbred for five years, and have never had any evil effects, and I have even had a great increase year by year in the same work.

Mr. Hunter: The moment you see a bird is constitutionally weak you should kill it. One successful poultry man that I know, who has made $9,000 in the last eighteen years, and who keeps about five hundred fowls, is a country storekeeper and only attends to the fowls morning and evening. I was going through his poultry house and he saw a bird that was out of condition, and he immediately twisted her neck and said he would bury her by and by. If we would be so true to ourselves as that, there would be no danger of our running down our stock even if we inbred. You might bring up half a dozen reasons why poultry plants fail, I am confident myself that it is the fault of the individual and not at all of the business.

Mr. Graham: How much are the newspaper men to blame?

Mr. Hunter: Quite a good deal. My conscience troubles me a lot.

The Chairman: Shortly, to summarize some few points in Professor Rice's remarks. He impressed me very much with the absolute necessity for a rigid culling of stock, and also pointed out the weakness from over kindness. He showed us a number of colony houses of various descriptions, and apparently from his experience the most profitable size for these colony houses is 8 by 8. That is the size I use myself. (Applause). One feature that is very pleasing is that we can do away with the fences. We have felt the necessity of putting up individual runs to our pens. With regard to Mr. Hunter's remarks, they can be summarized very quickly. The cause of failure is generally the lack of the man or the woman, or lack of capital, lack of knowledge, and lack of vitality in stock. Mr. Hunter has not heard of white diarrhoea. I think Mr. Graham will back me up that one particular form of white diarrhoea has done a great deal of injury. I believe it can be controlled, and we are going to do it. I am sure I express the feeling of the meeting when I say we are deeply grateful for the good advice these gentlemen have given us to-night.

JUDGING POULTRY COOPS.

The business now taken up was judging the poultry coops, designed and manufactured by the Short Course students.

In passing judgment Mr. Hunter said: There are so many points to be considered that the decision will seem almost arbitrary, but for my own use and judging from my own experience, I think the coop made by Mr. Cooper is the best for general purposes and general results, with one or two slight modifications. One reason why I think it is the best coop is that it provides for plenty of fresh air. This coop could be improved by having a hood over the front of it so that in case of a rain storm it would not drive in and it would provide shade as well. You can set two hens in this coop, and when the eggs hatch take out one hen and let the other mother the whole brood. Another improvement would be to put handles on the side for the purpose of moving it; and if Mr. Cooper would put a couple of roosts in his coop it would be better.

Mr. Foley: Do you think it advisable to let the chickens roost?

A. Yes.

Q. Why so?

A. Because it is their nature to roost.

Q. What about crooked breast-bones from roosting?

A. You will find crooked breast-bones from sitting on the ground. The bird was originally a wild bird and natural instinct makes it want to get up away from its enemies. I gave the second prize to Mr. Tebbs and the third to Mr. Chalmers.

The Chairman: I will now call upon Mr. Hunter to tell us about the Lakewood Poultry Farm, as Mr. A. G. Brown, the proprietor, is not able to be with us.

HISTORY OF LAKEWOOD FARM.

By A. F. Hunter, West Roxbury, Mass.

We would all enjoy this Lakewood Farm story more if Mr. Brown was able to tell it himself. Their method of feeding has been changed since the article I am going to read you was written. At the present time they are carrying the chickens through till they go to market by the hopper method of feeding, and Mr. Brown tells me that it cuts down the work more than one-third. They have over 3,000 head of laying stock and they are going to raise 10,000 chickens this year, and you can understand that where they cut down the labor one-third it makes a very great saving in the cost.

A poultry farm that cleaned up $7,000 profit for its owners last year may fairly be considered a successful one, and after a decidedly enjoyable day spent at such a farm, looking into every nook and corner of it, and studying the methods of operating it, I left Lakewood Farm with the feeling that here was the most successful poultry farm that it has ever been my good fortune to visit. The key-note to its most gratifying success is the business-like methods by which it is operated. Large poultry farms are not at all uncommon, and we have visited scores of them; but where Lakewood Farm stands out, head and shoulders above all others, is in the clean straightforward, business-like way in which the work in all departments goes on.

Why shouldn't it? Poultry raising is a "business," just as much as is selling dry goods, or groceries, or railroading or banking; and it has long been our firm conviction that the same business methods put into poultry-growing that are put into any other successful business of to-day, would result in quite as good success with poultry. Not so great, of course, because the field of individual effort is so much more restricted,—but quite in proportion to capital and labor invested.

Mr. A. G. Brown, the president and general manager of the Lakewood Farm Company, is a business man, and has had quite ample experience in business lines. He puts business methods into the every-day managing of the poultry farm work, just as did into mercantile business. In that fact lies the key-note to the smooth running of the Lakewood Farm operations, and the decidedly satisfactory showing of the balance sheet at the end of the year. He deliberately put aside a promising commercial business because he was so strongly drawn to out-of-doors life, and after two or three years of life in the Adirondac country he came south, to Lakewood, to find a milder climate and dryer soil on which to establish his poultry farm.

Lakewood Farm is situated in Burrsville, New Jersey, three miles from the popular winter resort of Lakewood, and as the latter is the railway station and shipping point, the farm was given that name. Mr. Brown is quite enthusiastic in his praise of the climate and dry soil of that section of New Jersey, and as land there is quite cheap (when one gets a bit outside of the resorts"), he thinks it is the best possible location for poultry work and health.

The farm was bought about five years ago, consists of about sixty acres of practically level, sandy soil, and is mostly covered with the small oak and pine woods of that section. A quarter of the land is cleared, is "farm land," but almost all of that part of the State is pine and oak woods. The farm house and poultry buildings are near the fine State road, but there are dozens of "colony" houses scattered through the open woods, where is a perfect range for young stock. The whole farm is enclosed with Union Lock wire fence, to keep the birds at home, and keep "varmints" out; Mr. Brown told us they had about five miles of wire fencing there on the place.

There are seven long poultry houses, each 128x16 feet in size, with eight pens to the house; there are about 60 birds in each 16x16 pen, and yards 100 feet long give exercise room for the stock. White Leghorns are the chief stock, but there are a few pens of Barred Rocks and White Wyandottes. It is significant of the moderate cost of lumber and labor there in Lakewood that these 128 feet long poultry houses were built at an average cost of but $600 each, and that includes the houses and yards all complete.

These long houses are not exactly alike, but a general description of the laying houses is that each 16x16 feet pen is entered from a door in the back side, the front being made of three windows, two of which slide, one in front of, and the other in back of the one in the centre, making the pen two-thirds open-front. These pens have an enclosed roosting apartment at the back made after the plan of those in the Maine Experiment Station houses. This roosting apartment is two and a half feet from the floor, and has a solid matched-boards floor three feet wide by thirteen feet long, and a solid matched-boards partition at the end, next the door opening into the rear of the pens; the solid partition between the pens makes the other end of this enclosed roost-place. A curtain attached to a swinging frame is hinged to the roof, and swings out and up to the roof rafters, and can be secured there, out of the way when not in use. It is only necessary to close these curtains in front of the roosting pens on the very coldest nights in winter; for ordinary cold weather the closing of the sliding sash-front of the pens is ample protection.

The breeding-houses are built with scratching pens in front of the laying-roosting rooms, and roost space is at the back. The yards to all these houses have scratching pens at the further end, and in pleasant weather of spring, summer and fall the grain is thrown into scratching litter in these pens. A commodious grain cook-house furnishes store room for the various foods, and is a work-room as well; besides having a cozy office in one corner and a sleeping room for one of the men in another corner. The whole of the well-lighted basement of this building is an incubator room.

It is the intention to winter about 3,000 head of layers, but the demand for chickens last spring and pullets last fall was so great they have now but about 1,400 head. At the time of my visit these were laying about 50 per cent. of their number, the egg-yield of that day being 634. The eggs are nicely packed in pasteboard boxes specially made for them, holding one dozen each, and are sold to a dealer in New York city, at the regular price (in winter) of 47 cents a dozen; in summer they are sold for 32 cents a dozen.

Many will wonder how this high price can be obtained for eggs sold to a dealer who sells them again, but there is no magic about it. In the first place the eggs are warranted to be fresh laid, and every one perfect. They are carefully tested (lighted), bfore being packed, and no egg goes into the boxes that is not absolutely right. They are wiped clean. if there is any particle of dirt attached to them, and when the customer gets them they are the choicest product of the poultry yard. The boxes Mr. Brown has made after the style of the well-known "inner seal" boxes in which Uneeda biscuits are packed, and the top of each box has printed on it:

Lakewood Farm Eggs.

Laid and packed at Lakewood Farm, Burrsville, near Lakewood, N. J.

And each box is sealed with a paper-sticker seal; the buyer is warned that the eggs are not guaranteed to be Lakewood Farm eggs if seal is broken. The boxes are 11 inches long by 3 3-4 inches wide and 2 3-8 inches deep. Mr. Brown said the only fault to be found with them was they were not quite deep enough, as Lakewood Farm layers lay such large eggs that now and then an egg gets cracked on the end by the pressure of the box cover upon it.

It is the intention to hatch out about 7,000 chickens for their own use this season, and the bulk of the cockerels are sold as "squab broilers," to the Lakewood hotels, at $1 to $1.50 per pair. They are sold when weighing 1 1-2 pounds to the pair. After being nicely dressed each pair is tied together by the legs with a wired tag of celluloid, on which is printed "Lakewood Farm, Lakewood, New Jersey."

For hatching the chickens there are nineteen 360-egg incubators, and for rearing them there is a hot-waterpipe brooder house 110 feet long and 35 individual brooders, the latter set out in the colony houses on range so that the youngsters are at home there when the brooders are removed, and they left in possession of the houses. Grass does not grow easily on that sandy soil, so crops have to be sown for green food. Every convenient (and vacant) piece of ground is sown to winter rye in the fall, and this gives green food very soon after the frost is out of the ground. This is followed by oats, and then Dwarf Essex rape is sown for the main crop.

A most important factor in a good growth in youngsters and egg production from the mature stock is strength and vigor, and the end aimed at, in both breeding and feeding is the most important factor. The chickens are grown on a prepared chick-food until they are past the need of the brooder, then gradually promoted to the regular ration of the layers. This consists of mash fed once a day, and either wheat, oats or cracked corn for a grain food. Boiled beets are the base of the mash every day, and there are three different mixtures fed, on three succeeding days.

No. 1 mash consists of 32 pounds of whole oats, steamed, 15 pounds cornmeal, 25 pounds buckwheat middlings, 10 pounds wheat bran, 5 pounds gluten, 8 pounds alfalfa meal, 5 pounds beef scraps, 5 pounds cracked bone, 2 pounds charcoal, 2 handfuls salt. The day this is fed the grain food is wheat, the ration analyzing 3:54.

No. 2 mash consists of 17 pounds whole wheat, steamed, 40 pounds wheat middlings, 8 pounds hominy, 8 pounds linseed meal, 9 pounds wheat bran. The alfalfa meal, scraps, bone, charcoal and salt, as above. With this is fed oats for grain, the ration analyzing 3:78.

No. 3 mash consists of 27 pounds of whole rye, steamed, 20 pounds wheat middlings, 20 pounds malt sprouts, 5 pounds cotton seed meal, 5 pounds wheat bran. The alfalfa meal, scraps, bone, charcoal and salt as before. With this is fed cracked corn for grain; the ration analyzing 3:32.

The above formulas are given in hundred pounds; the quantity of the mash fed being about 4 1-2 pounds per day to each fifteen birds, in two different feedings. In summer the amount of corn meal fed is considerably reduced. As the ration is a bit low we are not surprised that the egg yield was not quite so high as we would expect from good White Leghorns. The average was 148 eggs apiece for all kept during the year.

On the occasion of our first visit to Lakewood Farm, two years ago, they were feeding a prepared chick-food to the youngsters. Mr. Brown gave us a formula for a chick-food of the following proportions: 6 pounds cracked wheat, 2 pounds cracked corn, 1 pound "pin head" oat meal, 1 pound millet seed, 1-2 pound broken rice, 2 pounds fine (sifted) beef scraps. To this should be added about five per cent. of fine (chick size) grit, and for green food, chopped onions or chopped lettuce leaves should be fed.

And the resulting profits? That is the question that comes directly to the front, and the answer to it, in this case, is eminently satisfactory. After figuring ten per cent. of cost of farm and plant, and charging that amount off as depreciation, then figuring in five per cent. for interest and all expenses for foods, labor employed, etc., there was left a little over $7,000 as the net profit on the year's business. Certainly a fair return for the year's work. And this profit will be increased because additional business is being taken on. The sales of newly hatched chicks will largely increase; the eggs for hatching trade is being engaged in this year, and the advertising Mr. Brown is doing, using the eminently attractive headlines, "Lakewood Farm Layers, Are good Profit Payers," will decidely increase the cash returns, and the increased sale of breeding stock next fall and winter will bring another considerable addition to the year's business.

Some of that has already been done, as for example, the sale of 400 pullets last fall to stock a poultry farm in an adjoining town, for a thousand dollars. But that was not a profitable sale,—looked at from one point of view. We believe those birds would have paid Mr. Brown that money by the eggs they would have laid this winter for market, and this spring to sell for hatching purposes; and then there would have been the year-olds to sell for next year's breeders. We think there was more money in those 400 birds kept right there at home, and Mr. Brown will see it so, after he has built up the more profitable side of the business into which he is now going.

Then there is another step forward, which we believe will come later, in going into the show room with some of those superb birds, and winning prizes, and getting prices for the stock that now cannot be aspired to. Lakewood Farm has splendid White Leghorns, but the buying public does not know it yet. To advertise, and then to go to the shows, and then advertise more, and then more,—that is the natural development for a first-class poultry business. The foundation for that business is now well laid, and we confidently look forward to a splendid and profitable future for Lakewood Farm.

Mr. NIX: I have always used five per cent. of grit, but I think two per cent. is better than ten per cent.

The CHAIRMAN: Why not leave the grit on the floor of the pen?

Mr. HUNTER: If you use white grit the chicks will eat it rapidly and fill themselves with it.

Mr. FOLEY: Why not use sand?

Prof. RICE: I do not recommend that; it was simply an effort to find out whether grit is necessary or not.

Mr. HUNTER: Every up-to-date manufacturer writes off ten per cent. for depreciation and maintenance of machinery, and ten per cent. in some cases would not be a quarter part of the depreciation. Curtis Brothers sold $40,000 worth of stuff from their poultry farm.

Mr. H. R. GRAHAM: What was their profit?

Mr. HUNTER: About 33 per cent. They sold a lot of eggs for hatching purposes and a lot of young males. Mr. Brown showed his books and accounts to me. I went through the books, and I took the yearly balance sheet, and went all through it. I spotted $1,000 for pullets, and I said, "What is this?" and he said, "A friend of mine was starting a poultry farm, and he wanted some good pullets, and I sold him 400, and he thought he had more than he wanted, but, as a matter of fact, he did not have as many as he wanted." I said to him, "You sold them at a dollar a piece too cheap," and he said, "No. $2.50 is a good price for a Leghorn pullet." I said, "According to your other birds, they will have paid you between $2 and $2.50 profit if you had kept them;" and it is a fact in my honest judgment that if he had kept that additional 400 pullets he would have made $500 profit out of them.

Q. What is Mr. Brown's average egg production?

A. 148 eggs per hen.

Q. What was the average selling price?

A. For the six winter months, 47 cents a dozen, and in summer 32 cents, making an average of about 40 cents a dozen, and out of that must be deducted the cost of the boxes that he sent them in, which are about 1 cent a piece.

A MEMBER: You can buy them for $14 a thousand, printed.

The CHAIRMAN: I buy the boxes for $7.50 a thousand, and print a label of my own which forms the seal of the box, and they cost in all less than 1 cent a box.

Mr. **Graham**: Mr. Brown's boxes are different from anybody elses, and my recollection is that they cost 1 1-2 cents a piece. It looks like a macaroni box.

Q. Did Mr. Brown say anything to you about feeding iron to the hen in order to make the eggs better for the patients in the hospitals?

Mr. **Hunter**: Now that you refer to it I have an impression that he did. He is going to supply the public with an egg that is absolutely free from microbes and treated with iron so that you can take the iron into your system in small quantities. If you put an absolutely unfertilized egg into an incubator you can evaporate it all to nothing, but if you put the germ of life in there you either hatch a chicken or addle the egg. The unfertilized egg will keep fresh longer and if you can convince the public that it is better you can get a better price for it.

Mr. **Graham**: Do you not think Mr. Brown is a unique advertiser?

Mr. **Hunter**: Yes, he is, and I think he has something up his sleeve that I am not at liberty to tell you. Mr. Brown's firm is an incorporated company, and the books are kept just as they would be in a bank or in commercial houses, and he has submitted the trial balance to me.

Mr. **Graham**: Did you figure out which pays best, the broiler end or the egg end?

Mr. **Hunter**: I advocate working both. He had a thousand newly hatched chickens in his brooders in the fall.

Mr. **Graham**: What is the land worth down there without the buildings on it?

Mr. **Hunter**: The land is not worth very much; it is sandy. They can grow all kinds of fruit on it.

Mr. **Graham**: What is a good practical bird worth outside the show pen?

Mr. **Hunter**: I have known good, practical White Wyandotte males to be sold for $25, regardless of show qualities.

Mr. **Graham**: Would you pay $25 for an ideal, utility, White Wyandotte male?

Mr. **Hunter**: If I wanted it very much I would. I believe I would get the worth of it because practical stock of that kind is going to be appreciated by the buying public. It is being admitted by ninety per cent. of the buying public to-day.

Mr. **Graham**: Don't you think the trouble with most of us is that we do not know what we want?

Mr. **Hunter**: Perhaps that is the trouble.

A **Member**: How about buying a setting of eggs in the spring?

Mr. **Hunter**: In that case you are taking chances of these eggs developing into good stock, and it takes a real man or woman to raise real stock. I have seen chickens from the choicest eggs that I would not give ten cents for. A few weeks before the World's Fair, St. Louis, I was visiting a poultry man, and he was picking out some to go to the World's Fair and he said, "I have some better ones in the country. I sent so and so some of my best eggs and we will get the team and drive down there after dinner and look them over." I went with him, and you never saw such a sick man in all your life. He had not been down there for two or three months, and that stock raised from 400 of his best eggs that he could easily have sold for $5 a setting was not worth anything. They were a miserable lot of runts and scrubs, simply because the man that had attempted to raise them was simply a runt and a scrub himself. One of our dairy institute speakers says it is a scrub man that has the scrub cow, and it is true; and it is a scrub man that has the scrub hen, and the scrub man will make scrub hens out of the best stock on earth.

Mr. Blanchard, who is one of the best poultrymen in New York State, was driving out with me, and he said, "Here is a farmer who has raised 300 chickens this last year, and I was so busy that I did not get up to keep tab on him, and the result was that the pullets were only half size. You cannot get growth on birds once they are stunted. There seems to be psychological moments when you can make chickens grow and after you get passed that you cannot make any progress with them.

The CHAIRMAN: You spoke of the Lakewood Farm selling 400 pullets for $1,000. Taking twenty-five cents for the average price of eggs the year round, what would you consider the commercial value of a well developed pullet in the months of September and October?

A. It would depend upon the laying possibility of the pullet. He got 148 eggs, say twelve dozen, that would be $3 and it will cost $1 to feed the hen. I found one year it cost me $1.35 per head to feed my hens.

The CHAIRMAN: First you have $3 for the eggs, then you can sell the birds?

Mr. HUNTER: Thirty-five cents for a Leghorn.

The CHAIRMAN: Take a White Wyandotte.

Mr. HUNTER: They are worth $1.

The CHAIRMAN: Say 50 cents. The cost of keeping that would be $1 and that leaves $2.50 a profit. What should that pullet be sold for in September or October?

Mr. HUNTER: Looking at it from that standpoint, he got his profit out of the sale from the birds; but here is a point which he overlooked. These birds would have been worth $1.50 to $2 apiece for future purposes.

Mr. GRAHAM: Who is going to buy these birds at $1 apiece? Would you buy them?

Mr. HUNTER: Yes, I would. They would make enough in the year to pay for the feed, and I would have the eggs for breeding. A year old hen will give you more vigorous chicken.

A MEMBER: Which hen lays the most eggs?

Mr. HUNTER: Pullets every time; sometimes you will get an exception to the rule.

A MEMBER: Can you feed a hen for $1 a year, counting the cost of labor?

Mr. HUNTER: It does not cost Mr. Tillinghast more than 70 cents.

Mr. GRAHAM: The cost of feeding these hens at the experiment station was 95 cents exclusive of labor.

The CHAIRMAN: I made a very accurate test; fed the hens entirely on food bought in small quantities in the store, and figured up the average cost from month to month, and the total of the year's results was 96 cents exclusive of labor. They got no scraps from the house; everything was bought.

Mr. HUNTER: Orono, Maine, is as far north as Ottawa, and they have as cold a climate. They are 100 miles back from the sea; they do not let their birds out doors from the middle of October until April or May. Down there Prof. Gowell has built these poultry houses, and one man is taking care of 2,000 head of layers. He wanted to purchase 9,000 eggs in order to get 1,500 pullets. They have one house that is heated, and they get less eggs from the hens in that house than they do from the others. My good friend, Prof. Rice, spoke yesterday of the sturdy looking people you have up here in Canada. You are out doors a lot, and you get the benefit of the ozone in the air, and I think you should apply the same principle to your hens. These 9,000 eggs that Prof. Gowell got were so good that he raised over 4,000 chickens. The cockerels were sold off as broilers when they weighed 1½ pounds, and he sold 1,985, and his net returns from them was $1,078. He raised about 60 cockerels for breeders. He was planning to build a house 300 feet long for 1,500 birds, and he had to build a house 400 feet long in order to accommodate the additional birds. One bag of beef scrap that he bought was a little tainted, and in the house where this was fed there were four or five pens of chicken that were drinking an enormous quantity of water—three times as much as any of the other pens—and diarrhoea set in and several of the birds died. They immediately began reducing the diet, and took out the beef scrap and reduced the quantity of oats, and reduced the supply of corn. He did that for about a week, and then began feeding them up again, and, notwithstanding, this setback, when I was there in December they were laying about 600 eggs a day, and they increased to 800 and 900 in January, and at the last report he had was 880 eggs. The houses they are building in New Jersey are on sills 6 inches square, the floor stringers 2x8, and a double board floor. The whole house is as strong as a barn. He said, "I mean it shall be here when I am through with it." Lumber is so cheap in that region that the total cost of that house and a shingle over the house and the back walls double boarded and double boarded up the front was only $2,700 or a $1,35 per bird. Lumber is only $10 a thousand down there. They built the house themselves.

A Member: Does Bulletin 117 contain all this information?

A. No, it does not. This is on Prof. Gowell's private poultry farm. But Bulletin 117 tells you about the work of the station, and gives you the food methods they employ. This house is 400 feet long by 20 feet wide, and is divided into 20 feet pens.

The Chairman: To whom do we write to get that information?

Mr. Hunter: The Maine Experimental Station, Orono, Maine, and this information about Prof. Gowell's house will be published in the *American Poultry Advocate* in the March number. The Maine Experimental Station got about 158 eggs per year per hen. Their birds are bred for egg production, and have been bred by the trap nest method.

The Chairman: You said of Mr. Brown's house for his breed pens that he had a scratching shed in front of the roosting pen?

Mr. Hunter: An open front and just a curtain to be closed between the two.

Mr. Graham: I have much pleasure in moving a vote of thanks to Prof. Rice and Mr. Hunter for the very excellent addresses they have given us at this institute. The motion was seconded by Mr. Elford, and carried amid great applause.

EXHIBITION STOCK.

By William McNeil, London.

I do not see how it is that we have not more ladies in the poultry business, for I think they are more successful than men. If I were a lady tomorrow I would not marry a man unless he was a "chicken man," because they are the most kind hearted, men alive. (Applause.) I do not see why more people do not raise Bantams. If they knew as much about them as I do they would raise nothing else. They are nice for the boys and girls, and keep them at home.

I will give you a few ideas on the Cochin Bantam. It should be a bird something like what you would mould in a pail. It should be as round as possible. We do not want them with a long body or a big breast. You want a good full hind part, very fluffy, and with lots of feathers, with a nice breast and good cushion. That is a good type of bird and ought to be worth $15. In raising Bantams we try to breed from the very smallest, and another way is to breed them very early in the spring, and then turn around and breed from the young ones and get a second batch, and we can keep them small in that way. The Partridge Cochin should be mahogany in color, with a double row of lacing or penciling on every feather. Here is a bird that is no good in the world except that it is small (illustrated by a live specimen). It might be a nice breeder, but it has no color and no penciling.

Now we will pass on to some Black Hamburgs. There is no fowl on the face of the earth that will lay as many eggs as a Black Hamburg, and I can give you proof for it. We try to have them as plump as we can get them. I believe one black Hamburg hen will lay as many eggs as any two birds of another Breed. In breeding them if you try to get too high a color you are liable to get them with purple bars. We try to get them a green-black. Purple barred is a defect but not a disqualification. We try to get the hen just a nice even shade of dull black, and then we can get a very good cockerel. If we breed to a high-colored female we will get them red hackle. You can see the red shining in this bird (illustrated), and she has a tendency to be more bronze than black. This bird also has what they call a hollow comb.

I think a Silver Spangled Hamburg is one of the best birds bred, and when you get a nice one there is nothing handsomer. It puts me in mind of a dude coming out of a band box.

I never breed from more than two or three hens. I never have more than that many good ones. I do not do as lots of other poultrymen do. They have three or four yards and they sell their eggs at $5, $4 and $3, and if they have not any of the $5 eggs you get the $4, and if they have not the $4 you get the $3 ones. I do not sell any eggs except from the yard I breed from, and, as I never have more than three females to lay the eggs for myself, the people who buy from me get from the same pen. The males and the females must have the right spangle in order to breed good birds. I only try to breed for quality and not for quantity, and I think I am pretty safe for the shows if I can raise five or six of each kind. I get most of my birds raised in the country. I send the eggs out to the farmers and pay them 50 cents a piece for raising them. Supposing I get an order for a bird I go out to the farmers and give them $1, and then I will sell that bird to you for $10 or $15, and that is the way I like to divide up with the farmers. I would rather have a bird raised in the country than one raised in the city. I always get better color on the birds I get from the country than I do on the ones I rear at home. I think it is because they are kept clean and have a variety of insect food.

I have heard a great deal at this Institute about dry feed and soft feed. I know I can take soft feed and partly hard feed, and I can raise chickens as fast anybody I have even seen. My chickens get soft feed not less than three times a day. You cannot raise a first-class chicken on hard food alone. You must feed soft food. I never water a chicken until I cannot help it, because it will do as well without water. When I see a chicken running and licking the dew on the grass I give them some water. My hens will go from May and June to August without any water, and they will stay with the chickens all the time that they get soft food. I think diarrhoea is caused by too much water.

Q. What kind of soft feed do you give them?

A. I give them a little of everything. The first thing my chickens get is dry bread and hard boiled eggs; I am a regular old fogy that way. Then I give them a little oatmeal, and I use considerable of Spratt's Patent Food, and I use bran and shorts in equal parts.

Q. Do you feed much grit?

A. Yes, I have tried my best for the last five years to feed all the grit I can. I make a practice of feeding grit with the soft food, and I feed the chickens from six to seven times a day, and generally give them as much as they will eat at any one time,

Q. How many chickens do you have in a flock?

A. I will raise from 150 to 200 in my place. I live in the city, and I have not more than half an acre, house and everything.

Q. How many old birds do you have there.

A. I suppose I have there now from 200 to 300. It is the way the birds are looked after, and the way they are cared for, that makes success. When I am home nobody can feed the poultry but myself, and I felt sorry to have to come down here, because I would rather be home with my birds.

I may say that when I started in the poultry business I did not own anthing, but I have been very successful, and everything is flourishing. I started store-keeping, but I gave it up. We owe this College and the Ministers of Agriculture, particularly the Hon. John Dryden, a deep debt of gratitude. I have made all my money in the poultry business, and I can remember the time when it was up-hill work to go to a show. It was hard to get them to introduce a new variety. The Winter Fair and other fairs have helped us, and poultry are now booming, and I am glad to see so many here to-day taking an interest in the business.

Q. Do you scald the mash?

A. I used to, but I do not now.

Q. How do you feed the boiled eggs?

A. I boil them up and feed them to the chickens.

Q. What proportion?

A. Just enough; I cannot tell you exactly. We do not give them eggs very largely.

Q. If you had a bird with a side sprig would you breed from it?

A. Yes; but I would take it off first.

Q. Would it throw birds that way then?

A. No, I do not think it would.

Mr. Graham: Mr. Oke is now going to judge a pair of Wyandottee males, and I am going to ask him to score a Silver Pencilled Wyandotte cock bird. Mr. Oke tells me he is not a talker, but I want to tell you that he is one of the best judge of poultry of all varieties that we have got on the American Continent. (Applause.) I was at the New York Show, and several of the breeders and several poultry clubs made special requests that Mr. Oke should judge their varieties next year, and if you happen to go to the New York Show you will see the same thing. They all want Mr. Oke to be their judge. (Applause.)

Mr. Richard Oke: Talking is not my forte but I will try and give you my ideas on the different types of chickens. I do not expect to run up against a disqualified bird again after hearing our friend McNeill this afternoon. (Laughter and applause.)

In the first place I take the general symmetry of the bird. In the Wyandotte, the shape of the body should be short and compact, and you must take the length of the leg and thigh into consideration, and see that the bird is well proportioned throughout. This (illustrated) bird is what I call a very good type of Wyandotte.

Q. How does that type differ from a Rock?

A. A shorter bird altogether.

Q. How does an Orpington differ from a Wyandotte?

A. The Orpington has a longer length of back than the Wyandotte In the majority of poultry the length of feather produces the shape and the type. Take a Cochin. If the feathers are not properly matured a Cochin will not look anything. It will look all angles, and when it matures it changes into curves. I do not think any man can produce a bird with the proper length of feather by using hard feed alone. You have got to feed soft food. On the general symmetry I would cut that bird one-half.

Q. Do you score that on general symmetry and color?

A. No, that is just the general outline of the bird. I do not believe in score cards. I do not think any man can score a bird to-day, and then score it again to-morrow, and make the same score. I know one of the score card men in the United States sold a bird and sent the score card with it, and that bird was scored at a show and it scored 5 points less. I would cut the comb one point on shape. If they ask me to judge at a show where they use score cards I always tell them to get somebody else to do it, because I do not believe in it.

There is a hollow in that comb and the spike is too wide. It is a very good type of comb, not too large. On wattles and earlobes, I would cut it one-half. The shape of the neck is all right. For shape of wings, I would cut it one-half. He does not carry his wings properly, and I would cut him one on the shape of them, because he is a trifle narrow, and I would cut him one-half on the shape of tail. I would like to see it a little more fan shape. The body and fluff are all right. On legs and toes I would cut him one. There is a bright tinge on the feathers and the black is not distinct enough. I would cut him one on that. On color I would cut the wing one, and back a half, the tail a half and the breast a half, body and fluff one. I like the type of this bird very well but he fails in color.

Now take this White Wyandotte (illustrated). In my opinion there is no comparison between these two birds. The white bird is too long in the body, and I do not like the shape of his head. He hasn't got depth enough. He is about the right length of leg. He may improve, but he will never make as good a bird as the other.

Now, as to White Wyandotte hens. I consider the white bird is the better type of the two. The pencilled one has not got the right type of back. She is a little short on the shank, and too low down in proportion to the size of the body, and there is a difference between the two birds in the length of feather.

Q. How near does that bird come to your ideal of the White Wyandotte?

A. I would want a better head and a better lobe, and I would cut that eye about half a point. It is a little like a Leghorn, and she is too narrow across the skull.

Q. Would she throw single comb birds if mated to a narrow comb cockerel?

A. No, I do not think so.

Q. Don't you think a bird with a narrow head looks better than one with a broader head?

A. No, I think that bird would look better with a broader head.

Mr. FOLEY: In the Old Country they get a better length of feather by breeding early.

Mr. MCNEIL: When you hatch them late they do not get the same growth of feather as when they are bred early.

Q. If the bird had no white in the ear-lobe how far would she be behind the best four birds at the Madison Square Show?

A. You would have to put a little more in the skull. She is not quite as wide, but she is about the same type of hen.

WASHING CHICKENS.

BY WILLIAM MCNEIL, LONDON.

I have a special coop for drying the chickens after I have washed them. The trouble with birds, if you do not have a special place in which to dry them, is that they will sit down on the straw and they will never get properly dried; but if you have a special coop like this one I have here with a double wire net bottom, there will be no trouble. I put the birds in the coop, and I have a thermometer hanging up in it, and I let the heat go up to 109 or 110, and they will dry off very quickly. You can stand this box on the top of a stove or hot air register, but watch them that they do not get too hot. I have mine on the top of the stove.

It is hardly necessary to wash a black bird. Before I go to a show with black birds I go around with a pail of soft water and sponge, and I take the bird up in my hand and damp it all over, and then I put it back on the perch, and that bird will not go to sleep until he has every one of his feathers dried, and everyone of them will go through his beak. I do Silver Sebrights in the same way and the Golden Sebrights also. I go over every bird in that way before I take them to a show. I only sponge them once.

Q. Do you think it necessary to sponge a buff ?

A. Certainly; you know how much better we feel after we get washed up. You should wash a bird three or four days before the judge sees him, because you wash all the gloss off, and it will take him that long to get it back again.

Q. Can you put a gloss on artificially?

A. You could by feeding them.

Q. Can you put any oil on to make them glossy?

A. No, nothing but clean water for a chicken. The minute you put oil on you spoil it. Before I commence to wash I have my sponge and everything handy and I hold the bird and do everything myself. When I have not the right kind of soap, I use Pearline. I like Sunlight soap better than anything else. I put a little borax in both the washing water and the rinsing water, and it will cut out any soap that may get in the feathers; and if the feathers are at all creamy I put considerable blue in the water, but if feathers are snow white then I do not use blue upon that bird. This bird (illustrated) would take three or four washings to make it good. The first thing I do is to wash the crest and beak. As soon as I am through washing them I put them in the drying coop and after put them in a shipping coop. Keep them there for twenty-four hours to cool off, and there is no danger of drafts. I always rub in one direction when I am washing, otherwise there is danger of breaking the feathers. I never use a towel in drying; only I cannot get out any more water with the sponge, and in order to start the bird drying I raise up all the feathers. Sometimes I go over the bird with a sponge dipped in blue water. If the feathers are too oily put the bird in the sun and that will take out the oil, and where the bird is creamy you can take a strong dose of blue water and soak the hackle and it will take out the creamy water.

I feel that I owe much to this College, because I never go any place where I feel so much at home. When I think of the amount of good work that the College has done for young Canadians, and when I think of the chance you young people have to what I had, then you ought to make perfect chicken men, and if you do not go ahead then you are no good. I wish I had had the same chance. I look upon Mr. Creelman, the President of this institution, as one of the finest men in the Province. I do not think there is another man in Canada who could take the place he occupies. We have taken kindly to Mr. Graham. We have found him straightforward and he has been a great benefit to this country. Mr. Graham will tell you that we have all worked together.

Mr. Graham: I think it is only our duty to pass a vote of thanks to Mr. McNeill and Mr. Oke, who came all the way from London to tell us something about chickens. I can tell you that it is not often that Mr. McNeil opens his heart to you, and if you do not appreciate what he has told you it is your own fault. I have much pleasure in moving a vote of thanks to Mr. McNeil and Mr. Oke. The motion was seconded and carried.

Mr. McNeil: I can assure you that I accept it with very good grace. I can say for Mr. Oke that it is his first appearance, and he is a little shy, the same as I used to be. There is one thing that I am proud of, and that is that he is going to be the best judge that we have in America, and that when he gives his decision the boys can go around and they can decide on the same bird.

Mr. Oke: I am sure I try to do the best I can. We all make mistakes. If I have been of any benefit to you I am sure I am very much pleased. This is my first visit to the College, and I hope it won't be my last.

DISCUSSION.

Mr Graham: Do you know anybody that is raising chickens in winter on the dry feed method?

Mr. Hunter: I do not.

Q. Do think it would be advisable?

A. I do not know why it should not be.

Q. Do you think there would be any danger of leg weakness?

A. I do not see why there should be.

Q. I would like to show you some chicks that I have been feeding on the dry feed method?

A. If you had another pen that were fed on the wet method I think it would be a good test. Mr. Tillinghast has a farm of about 150 acres, and there is a little brook winding through a field for half a mile, and a lot of springs coming out of the bank below where he has located his houses, and he does not water his birds at all. When there is snow on the ground they eat the snow, and as a fact, the birds fell off in their egg yield when the snow went away last winter and they had to carry water for the hens.

Q. Don't you think the dry feed method would draw the rats to the place?

A. No; I did not see any rats on the place. Up around the homestead near the railway he had some rats.

Q. Do you know that he has a practice of putting crushed glass in the meat scraps for the purpose of killing the rats and dogs?

A. No, I do not think it. That remarkable work Mr. Tillinghast is doing has certainly excited a lot of talk. The first time I visited him was about a year ago the first of February, and in going about the houses where he was supposed to have about fifty birds in each house I personally saw twenty-six eggs taken from one of these houses that day.

Q. Did you go around the next day?

A. No, I did not.

Q. I heard it said once that he had them all fixed up because he knew you were coming there?

A. No; he did not know I was coming, and I am satisfied he did not load his nests.

Q. Do you know anything about the mortality among his stock?

A. He has very little of it. I saw more than three thousand birds, and we only saw two birds under the weather. His stock is mostly Leghorns, he has a few Rhode Island Reds, but all he pretends to keep is White and Brown Leghorns. The last time I was there in August, his foreman was sick, and the work was somewhat in arrears, and I complained to him about his not giving egg yield, and he went to his desk and showed me his bank balance, and it was a good one. A good deal of his land was set out with apple trees, and that makes a more excellent addition to a poultry plant, and he sent me a barrel of apples that were grown on trees set out only six years ago, and each tree averaged about a barrel apiece.

Q. Do you think you can spray an orchard and not hurt the chickens?

A. That is something I have not had experience with.

Mr. Graham: I know with us the chickens do not pretend to keep down the worms.

A Member: I have noticed we have not the borer since we have had the chickens running in our orchard.

Mr. Graham: Can you grow a crop of apples and have them free from worms and scabs without spraying?

Mr. Hunter: I do not think you can.

Q. How many acres of land has Tillinghast in a poultry plant?

A. Perhaps seventy-five or eighty acres. He had three thousand laying hens last winter, and he says that in artificial brooding he gives them nothing but wheat screenings from the start.

Q. Is it a fact that there were fifteen carloads of wheat screenings delivered at his station in one day?

A. I doubt that, because I did not think any market could supply fifteen carloads of wheat screenings.

Q. What do they pay for the wheat screenings?

A. About twenty-five dollars a ton. There is very little dirt in them. Of course there are weed seeds.

Q. Do you know whether it is spring wheat screenings or from fall wheat?

A. It is simply classed as wheat screenings.

Q. Are there many weeds around the Tillinghast place?

A. Yes; he does not care for them. He lets the weeds grow for shade. He does not pretend to cultivate his land; it is a poultry plant purely.

Q. Would you buy screenings in preference to the sound, clean wheat?

A. I have said I would not, but when I have seen such results as Mr. Tillinghast gets I am inclined to think wheat screenings a very superior feed. There is this point, that the price will not remain at $21 a ton if the demand increases.

Mr. GRAHAM: This talk of feeding beef scraps has put up the price of beef scraps.

Mr. HUNTER: I want to tell you about a flock of 2,000 pullets raised on this dry feed system. The eggs were laid last spring at the Maine Experiment Station. 2,000 pullets were housed in one house 400 feet wide by 200 feet long, divided into pens 20 feet square, and they were laying from 800 to 900 eggs per day in January, and when I was there in December they were laying 600 eggs per day.

Q. Do you know when they started to lay?

A. I did not ask for the figures for November or December, this was on a private farm.

Q. Did one man take care of these 2,000 birds?

A. One man is doing all the work, and he is not overworked; because when we went to the farm we found him playing with the collie dog, and that showed he was not overworked, and was not tired out.

Q. How many birds in a pen?

A. One hundred in each pen of twenty feet square.

Q. In your opinion, if you had to house 1,000 birds, would you put them into two flocks or twenty flocks?

A. I should divide it into twenty flocks, fifty in a flock.

Q. For what reason?

A. Because I think I would get better results.

Q. Prof. Gowell of Orono, Maine, is carrying out some experimental work of that kind?

A. Yes. At the station they have pens 30x16 ft., and they have some pens with fifty in, some with one hundred, and some one hundred and fifty. He has one house with six pens: fifty in two pens, and one hundred in two pens, and one hundred and fifty in two more.

Q. Would that not simplify matters very much if you could put one thousand birds in one house?

A. The expense of fencing is not so very great, he does not set the posts he merely drives in stakes. I visited one poultry farm, and the owner was proud of the fact that his fences were up nice and looked straight, and everything in good shape, but that man failed. I think he was too proud about his fences, and not particular enough about his poultry.

Q. Do they get as good fertility from a large flock as from a small one?

A. That is a thing I forgot to ask about. Mr. Hitchcock has a house 51 1-2 x 10 feet in which he keeps 250 birds.

Q. If you were going to build a house yourself you would not put over fifty in a flock?

A. That is my opinion.

Q. Make your pens thirty by sixteen?

A. Yes, I think so.

Q. Why not build the house square, and put them all in together? Build the house fifty feet square?

A. You could not get in the sunlight.

Q. If you had one thousand hens to house would you prefer continuous house or colony house?

A. I would prefer one house because of the saving of labor. Mr. Tillinghast feeds his hens only once a week.

A Member: The great point that has been forced upon us is exercise, and they get more under your system of dry feeding.

Q. That depends whether you throw the dry grain on the straw or in the hoppers. At the Maine Station they feed 2,000 birds, and the man goes through the hen house with a trolley car that runs from end to end; the cracked corn is on the car, and he gives about four quarts to each one hundred birds which is just thrown over the litter and then goes on to the next pen. About noon they go through with a second feed of wheat and oats, and that is just thrown in the litter.

Q. How fine would you have the dry mash?

A. Two hundred pounds of wheat bran, and one hundred each of the other ingredients, which are corn meal, wheat middlings, gluten meal, linseed meal, and beef scraps.

Q. What would you use as a substitute for corn?

A. Ground buckwheat is very nearly the same.

Q. Why does not Prof. Gowell feed his meat scraps in hoppers?

A. He does feed some in that way; he figures on putting ten per cent. of it in with the meal.

Q. Did you notice that Prof. Gowell's birds have a glossy plumage?

A. Yes.

Q. How much of that is due to the linseed meal?

A. I think a good deal of it. A well known poultryman went to the Maine Station in September, and tried to induce Prof. Gowell to part with two hundred of his birds, and he offered him $200 and finally $500. Prof. Gowell told him he was under agreement not to sell except in the regular market, and this poultryman told him they were the finest lot of birds he had ever seen in his life.

Mr. Graham: He told me he raised these two thousand birds on three acres of land, and I gathered the impression that he never let them out of their runs.

Mr. Hunter: I have an impression that he did let them out.

Q. Do you know how many years they have raised chicks on that three acres of land?

A. I think about a half dozen.

Q. Does he not use Johny cake when he begins to feed his chickens?

A. I doubt it, because I think they have fully adopted the dry feeding method.

Q. What grass do you recommend for the runs?

A. For my own part, I prefer red top and timothy. I use a mixture.

Q. Do you allow the grass to grow so high in your runs that it gets too high for the chickens?

A. Yes. I mow it before I put the chickens in.

Q. How many chickens can a man look after if he wants to do the work himself?

A. He need not keep more than one thousand hens and raise three thousand chickens to keep him busy.

Q. How many would he have to hatch to raise 3,000?

A. It depends on who is doing it. When Prof. Gowell intended to start this private poultry farm, he thought he would have 1,500 pullets; to get them he calculated he would have to raise 3,000 chickens, and he estimated he could raise the chickens from 9,000 eggs. Thus he would need to incubate 9,000 eggs to give him 3,000 chickens, which would give him 1,500 pullets, and he bought 9,000 eggs, incubated them and they hatched so much better than he expected. He got 4,000 chickens; he marketed 1,900 broilers, raised about 60 breeding cockerels, and put 2,010 pullets into the house. He raised a total of about 4,100 chickens from 9,000 eggs.

Q. Where you feed the birds on this dry food don't you think there is great danger of their not exercising—the old hens becoming too fat?

A. It has not proven so at the Maine Experiment Station.

Q. Are not all the birds pullets?

A. No; they have some three or four years old. They are feeding a mash-mixture as well.

Q. How often do you have them remove the litter?

A. Every two or three weeks if they have board floors.

Q. With an earthen floor do you think the grain would work into the litter?

A. They put in eight or ten inches of the litter. I never saw as much in any poultry establishment before.

Q. Would you recommend board floors?

A. I would if the soil was not absolutely dry.

Q. How does he keep rats from under it?

A. Rats won't go through a two inch board floor. His floor is two feet above the ground, and he can put a terrier dog under.

Q. Is there no waste of food in feeding this dry mash?

A. No.

Q. Would you recommend the addition of alfalfa to that dry mash?

A. I would not say as to that. Prof. Gowell gives each pen of birds a quantity of cut clover every day and also mangels and sugar beets.

Mr. Graham: Our hens will eat ordinary cow sugar beet, but they will not eat the regular sugar beet.

Q. How do you like cabbage for feed?

A. I would be cautious about feeding it to laying stock because there is danger of producing diarrhoea, also danger of the eggs smelling.

The Chairman: I think mangels and sugar beets are the best vegetable we can feed, and I like them for the little chickens.

Q. Do you think we can take a batch of chickens hatched to-day and put them in a brooder and put down a heap of any kind of commercial chick feed, and a little heap of beef scrap and feed them in that way and have them alive in May?

A. I do not see any reason why you should not.

Q. Would you recommend watering the hens with warm water, cold water or snow?

Mr. Hunter: I can tell you what Prof. Graham is doing at Connecticut. He fed some hens on snow as long as the snow lasted. Some were watered with cold water and others with water that had the chill taken off, and it is a remarkable fact that during the time they fed the snow they were the best layers of the lot, and when the snow melted, and they had to water them, they fell off in their egg yield.

Q. Have you any preference as to whether you would give hard or soft water?

A. I do not know whether I am posted on that point at all. Mr. Tillinghast's hens are raised on a fifteen acre plot largely set out with trees and small fruit, and the chicken houses are comparatively near together, and his chickens exercise by running out over the range. If you have a very limited area you have to resort to other means of making the hens exercise.

Q. Supposing we start to raise a few chickens on an acre of land can we do it by this dry feed method?

A. I do not know.

The CHAIRMAN: I do not see the advantage of taking the straw out in the winter time. By the addition of new straw you can keep it all right. If the straw was damp I would have it taken out, but as long as the straw is dry I think it is all right.

Q. How do you reconcile the idea that eight or ten years ago we were told that to get fertile eggs we must make the hens exercise, and now we are told that we must fill them up from a hopper.

A. Mr. Brown has a hopper up on an incline plane, and to get to the hopper the hen has to walk up this incline, and to get a drink she has to come down again and she gets exercise in that way. I know one man who got one thousand chicks out of one thousand eight hundred eggs. There is a man in Tennessee who hatches eighty-nine chickens out of one hundred eggs. He goes through the brooders and kills every weakling. I went through Mr. Brown's brooder house a few weeks ago, and as he was going along he reached out and he said, "There is a weak chick," and he picked it up and wrung its neck. He did that with several, and I think if we would all be as rigid in culling from the very time the chicks as hatched, we would avoid any danger of ever hatching from debilitated stock. Eliminate the weaklings and have nothing but good stock in your breeding pens, and then you will not need four eggs to hatch a mature chick.

Q. Would not these weaklings make market chickens?

A. Yes, but they would not pay. They are always poor weak things and undesirable looking.

The CHAIRMAN: I will now call upon Mr. F. C. Elford, Chief of the Poultry Division, Ottawa.

Mr. ELFORD: The subject of discussion is one to which I have given quite a little thought, and I believe we should give more consideration to this dry feed system. We have to consider the hired help problem, and we must arrange so that we can feed our poultry at less cost. We cannot afford to pay out high wages for a man to feed a few hens. I enjoyed my visit to the Tillinghast plant in January, and I believe it would pay any person to go over there and look at the plant. He certainly has the labor problem down to a minimum. The operation of feeding these three or four thousand birds was very simple and very interesting. Now, as I went over that plant I noticed three birds that were a little out of condition, and that was out of three or four thousand. These birds were not very much out of condition; I didn't see one that was sick. Mr. Tillinghast said to me, "I used to have a hospital that I put my sick chickens into, but now I never have any sick ones." I saw one of the old system of keeping chickens where there was three hundred birds as against Mr. Tillinghast's three thousand birds, and they had two men looking after the birds all the time, and an extra man when the work got a little behind, and a number of these birds were not in good condition. The houses were covered with one-quarter inch of frost. The birds were not in as good condition as Mr. Tillinghast's, and the work was about ten fold, and it appeared to me that Mr. Tillinghast had probably solved one of the problems we have got to settle in the poultry business. Mr. Tillinghast said that his birds just cost him one dollar a head to feed annually. He used to be in the store business, and made $1,500 in ten months in that business, but he gave that up to go into the poultry business. He feeds his chickens once a week. He simply puts a bag of screenings in there once a week. He pays $1.15 a hundred for them. That is all he fed them with the exception of a handful of cracked grain he threw on the litter at night.

When I was there the ground was covered with snow, and some of these hens were fifty yards from the house, and they had to walk down to this little creek to get water. He said that when this creek was frozen over and there was no snow on the ground he had to give them water. I went into some houses on Mr. Tillinghast's farm that had not been cleaned out for two years; I took his word for it. I counted only two houses where there was an offensive odor. His hen houses are ten by twenty feet, and in these houses he keeps fifty to seventy-five laying hens. He said he hadn't any rats.

A MEMBER: I do not believe that fowls that have been brought up under the conditions that we have been feeding them will make the best result. You will have to make a gradual change where this method is tried.

MR. GRAHAM: We tried a brooder full of chicks on that dry food method, and they did well until about three days ago, and then they started to go off their feed, and if they do not all die in ten days, I do not know a chicken. They certainly ran outside and jumped around and scratched the straw. I think these chickens were growing too fast.

The CHAIRMAN: If grown out of doors the results might be very different or had we fed more vegetable and mineral foods. I got my food boxes made at the box factory. They are twelve inches deep, twelve inches wide and twenty inches long, and they cost complete about fifty cents each. I put them on the open ground facing the south. At what age do you commence to feed meat scraps to laying chicks?

MR. HUNTER: Right from the start. They are experimenting with feeding ducks on dry feed. They had a pen at the Boston show; they would average five and a half pounds each, and were only six weeks old, and they had been fed on this dry food method. There are two large duck growers in Ransomville that marketed 25,000 ducks last year, and curiously enough they marketed quite a number in Canada. They are trying this dry-food method and they have had remarkable success with it. It is ordinarily expected that it takes ducks ten weeks to grow to a market size, but some of these ducks had been killed at eight weeks and weighed five and a half pounds dressed.

Q. How do you think dry feeding would work on a farm?

MR. SNIDER, Burgessville: I do not know; there are very few chicken fanciers with us.

MR. F. W. KROUSE, Guelph: From what I have heard here to-day I am going to try the dry feeding method.

MR. MOUNCE, Armstrong's Mills: I do not think I could fatten them with dry feed: and another thing, I do not think the ration you have given us to-day would give the chickens the right color.

Q. Have you made any observation on the size of the eggs laid by hens fed on the dry system and mash system?

A. I do not think there has been any observation made.

The Chairman: I noticed that at times my hens would lay large sized eggs and the next week they were not so large, and I found the same thing existed on the farm next to me. I do not know whether it is due to the weather or what is is.

Mr. A. W. Foley, Bowmanville: We have two hens that lay invariably the same sized egg.

Prof. Rice: At the lecture to-night I have two or three lantern slides that show some eggs that we saved from the trap nest record when we were trying to find out if we could solve some of these problems in regard to the variation of eggs whether it was due to the individual or not and I think you will see from these illustrated slides that each hen's egg has an inborn type, a characteristic egg in shape.

We had a white Plymouth Rock which laid an egg with a little wart expansion on it about the size of a pea. We had one hen whose eggs were so characteristic that any one of our students could go in and pick out any of her eggs. I think the variation of the hen's eggs from day to day might be due to the weather. We know that a cold or damp day will effect the milk flow in a cow.

The pigment that forms that coloring of the shell seems nearly always to decrease the longer the hen lays, and I have noticed with turkey eggs the first one has the deepest and plainest spots. I think the pigment is played out towards the latter end, but the color will come back again when she begins to lay again.

The Chairman: For a number of years I had most excellent results in feeding mash. In making it I used water or milk. I have always kept a large number of sugar beets and mangels, and I put them through the meat-mincer, and then I mix the meal and grain with them. The difficulty in the dry method of feeding is the question of young chicks in April. If you have chickens out at that time what are you going to do for green feed? I think the best feed is to mix the pulp with the grain.

Mr. Hunter: Doctor Nottage says he would chop cabbage, lettuce or onions if there was no grass. Green food is as essential to them as fruit is to us.

Mr. Graham: How would hay tea do to give them to drink?

A. I do not know, but it would be a good scheme; you might try it.

The Chairman: I am sure we all feel very grateful to Mr. Hunter for the information he has given us.

A Member: Do you think the curtain front is a good thing for a roost-house?

Mr. Hunter: Yes, I think it is a good thing; but you only use it in cold weather.

The Chairman: My experience with the curtain is that if you have a house pretty full of hens you must be careful how you drop it. I do not drop my curtain unless it is likely to go below zero, but only where there were less than ten to twelve birds, and drop it in coops where there are single birds.

Q. What time do you drop your curtain?

A. If my man is quite sure it is going to be a cold night he drops the curtain when he goes out to empty the water dishes.

ARTIFICIAL BROODERS AND BROODING.

By James L. Nix, Homer City, Pa.

The Chairman: In taking up the subject of rearing chicks artificially, the feeding end of it is the most serious and most difficult, and requires the greatest experience. It is a common saying "I can hatch the chickens, but I cannot raise them."

I will first take up the matter of brooding apparatus. There has been a great deal of experimentations in brodders. The three methods that have been tried are, bottom heat, side heat and top heat. The bottom heat is the easiest to construct, and during the natural season when the vitality of the chicks is strong and the weather not very cold, some very good successes have been secured by that method, but no bottom heat brooder has every been constructed that has survived. It does not make any difference what the brooder or incubator manufacturer puts out, somebody will try it, because the poultry fraternity has always been looking for a good brooder and we find in our correspondence that we get about three times as many letters in regard to brooders as we do in regard to incubators.

One of the first questions is that of vitality. If you have no foundation to build on you cannot succeed. Mature birds will give you the best chicks and the easiest to raise. I mean by mature birds, birds that are in the second year, or over, in age.

If you are looking for vitality use yearlings. If you must use pullets, take well developed ones and mate them with a year old cock. If you have hens, and if you want the greatest number of fertile eggs, use well developed cockerels. The use of young birds for breeding purposes will not give the vitality. Where you continually breed from cockerels and pullets for a series of years your vitality becomes so low that it is almost impossible to raise chickens.

When you have the birds the next thing is the proper housing. We have been entirely too kind to our birds in the matter of housing. I think in the plant at the College, the house where they will get the most fertile eggs is the one down at the end of the row with the most cracks in it.

I offer these suggestions so that you give your laying stock all the fresh air possible, without drafts. The open front house has developed the highest percentage of fertility of eggs—of eggs that not only show fertility but have hatchability. I do not see why the ordinary straw mat used by greenhouse men would not make a very good curtain to close the open front house. You get a diffusion through the open porous screen much better than you would by a tight canvas. There is not a great quantity will get through a canvas screen. Incubator people have found that the dry feeding method gives stronger and better germs than where you feed the soft food, because the latter stimulates too much, you may get a greater quantity of eggs but they are lacking in hatchability. The exact reason I may not be able to say, but overfeeding and stimulation are injurious. The general breeder should put into practice the trap nesting system, and I do hope that somebody will have public spirit enough to trap nest with a view to developing not only a large egg production, but an egg production that shows and has a high percentage of fertility. When the birds are in their natural conditions there is no trouble about securing high fertility. Your success in any matter is only as great as the weakest point in the chain; weakness in one link of a chain will destroy results. They must be properly incubated, and you want an incubator that will give you strong chickens. Sometimes you will get a high percentage of strong chicks, but they will not live because they are not healthy. The question of the location of the incubator has a great deal to do with it. I believe the incubator that secures the proper condition on the inside of the egg chamber is the best. I am working on an incubator that seems to give great promise. The greater amount of oxygen you can get the more normal your chicks are going to be. You will find that the relative humidity is very largely increased by the water produced from the lamps, and you get noxious gases, and it is beyond the power of the chemist to tell their effect and you have the same conditions that you have in acute diseases when toxemia produces death. Toxemia produces paralysis in the nervous system, and that is the cause of death. I often talk with physicians regarding the physical conditions in the human system, and I had one expert tell me that death in the human being was caused nearly always by pathological conditions; one was toxemia and the other was uremia. You can call the disease anything you like, but either one of these two things were the cause of death. Toxemia are those poisons, the waste products, and in any acute diseases by treatment that can eliminate these toxemia by stimulation and keeping up the secretions a cure is effected. The great strain usually comes, in conditions of that kind, upon the kidneys, and this toxemia produces inflammation, and the uric acid is dammed back and produces uremia, and that in combination with the poisons of the toxemia produces stagnation, and the nerves are paralyzed and the heart's action becomes weak. I attribute the results to incubators, and the toxemia effects to the poisons that may be in the air retarding development. We have an example in this little chick that was dissected on the table yesterday, showing the retarded development, the condition that you find in this white diarrhoea. I rather think that is due to the incubator, or the condition in which the incubator is being operated.

There are two general systems of brooding known as the hot water pipe system and the lamp system. I will take up the hot water pipe system first; as a rule that is the only system employed in the large commercial plants, and for several reasons. One is it is economical, and another is its safety. Its only drawback is that you are unable to have an individual brooder with that plant; but I believe in the near future we are going to use the development of the individual brooder on the hot water system, and that is the ideal system for the large commercial plants. There is, of course, the open pipe system. The original system was the closed system. That was where they used from four to six pipes and a hover, built over these pipes. They used an inch and a quarter pipe. Where they were liable to have cold weather, they sometimes used an inch and a half pipe. They are placed on the centre and about four inches over the little chicks. These are placed about four inches from the floor, and in order to let the water circulate the rule is to have an upward circulation of five-tenths of an inch to the foot.

In constructing the brooder they simply throw over a patent barn door, about eighteen inches wide, and on that they put a felt curtain and they have the brooder, but it is not everybody who has succeeded with this brooder. It is necessary that you should have a regulator on the hot water heater, and there are two systems of regulation, expansion, and electric system. The cost of the electric regulator is from $18 to $35. They put in an electric thermostat, and that is connected with a clock-work mechanism, and they can maintain the temperature a good deal closer than in any other way. A disadvantage is that the whole system is at the same temperature. Another criticism I bring against the electric regulator is that it opens the door or shuts it off completely. In the warm weather the doors are open and the fire burns up briskly, and it takes a long time for the water to cool off, and by that time the fire is again out, and the result is a great loss.

At a farm in Waterford, N. Y., they tore down the electric system and put in the expansion system. It is so simple that you can instal it complete in your brooder house for about twenty-five cents.

In selecting a hot water heater for your brooder house secure one that is lined with fire clay; because where you have the fire clay your coal will stay red while the fire is cooling off. The brooder stove is the simplest and cheapest you can use in a brooder house one hundred feet long; and if you go over that length, it is better to use a hot water heater. These brooder stoves are made to a capacity of three hundred square feet of radiation.

In this method of regulation you use what is known as an open tank. In your expansion tank you put a float, and the tank should be one-fortieth of the capacity of your water capacity of your heater, and the heater pipes one-fortieth of the entire system. In order to prevent evaporation, pour about a pint of oil on the top of the water.

Q. That is the same system as the old Monarch incubator?

A. Yes. The trouble with that is if you were running the incubator and had everything adjusted for 103° or 105°, and if the temperature went up a little outside; a little bubble of air might escape and change the adjustment and it would run up to 120°. In this system there is no air, and you get an expansion of water. I think the expansion is one-eleventh from boiling to freezing point. You could leave the draft open in the bottom of the heater and have a cast iron lid that will shut down on the top of the fire-pot, and when that is shut it is perfectly solid, and you will not have any combustion, and the movement of the valve of half an inch will control the fire. It is the best system of hot water regulation.

Q. Do you use a block of wood for the float in the expansion tank?

A. We just take an ordinary galvanized can about six inches in diameter. In the eight-inch expansion tank use a seven-inch float.

Q. What would it cost to instal that system in a fifty foot brooder house, supposing you had it in this brooder house here?

A. In cold countries they put in wall pipes in addition to the four pipes for the brooder. You would require a heater and that would cost about $35, and the cost of a regulator would be very little. I have seen them take an ordinary wash pan and put a top on it and solder a galvanized iron right on it: and the float only cost about fifteen cents. But where it is properly manufactured it would cost about $1. You can use an ordinary chain to connect the damper. The whole equipment of that system would not cost more than $200 for a 50 ft. brooder house. The heater would cost about $35, and with the expansion tank and everything complete it would cost about $40.

Mr. Graham: It would pay us better to buy a heater and expansion tank.

Mr. Nix: I do not want to sell you people goods, because I am not here for that purpose. You should use soft water for this system, and it will not take very much water if you put oil on top of the tank. Your loss would not be more than a quart a week.

Q. What becomes of the gas from the coal if you shut that down?

A. There is enough leakage to keep the fire burning, but not enough to generate any large quantities of gas. You must use anthracite coal.

Mr. Robertson: I understood from your first explanation that there was a check draft open at the top. You put the check draft over if you don't want to use it. The disadvantage of the four pipe system and the covered hover is that it lacks ventilation. I have never seen materials that fulfilled all the requirements. If you use a cloth the chickens unravel it and get it round their necks, and in the morning you find some of them strangled, and they will pick at the cloth and swallow parts of it. They pick flannel to pieces. One of the best materials is felt. Some people use oil-cloth. The trouble with this is that it is always curling up. Leather fulfills all the requirements but it is too expensive. The ordinary heater would use about fifty pounds of coal in a day. It is cheaper than coal-oil.

Mr. Elford: Is there any truth in the statement that many plants in the States that have been operating under this system have taken them out and are operating under the individual brooding system?

A. Yes; this is true. The next development of the pipe brooder system was the open pipe system. They use from six to eight pipes with that system. They do not use any hover at all; because the most economical system is to use six inch-and-a-quarter pipes and they should have sufficient radiation of heat, the brooder house in the coldest weather to eighty-five and ninety degrees.

Prof. Graham: Do you think six-inch or four-inch pipes would heat our brooder house?

A. Yes, I think you will heat it with six-inch pipes. If you have a large pipe you get a more rapid circulation of water. They usually connect each three pipes with a manifold connection.

Q. Is the manifold connection the same as we call a header?

A. Yes. The system is always put in with a gradual upward slant, ten inches to the foot. Water will circulate on the level, but it circulates better on an incline. At the far end you have to put an open stand pipe or air cock. I prefer the open stand pipe because you do not have to pay any attention to it. This system is the one that is used by the soft roaster growers near Boston. One advantage of this system is the ability with which you can handle large flocks. On the close system you are limited to fifty or a hundred in a compartment. I visited a farm where they used this system for twelve years. For the first four or five days they had pieces of white cloth which they laid across the top of the pipes to send the heat down to the little chicks, and after five or six days they removed this. The object of this system is to make the brooder so warm that the chickens will not crowd up, and they get unlimited quantities of fresh air. This system has the disadvantage that with a high temperature the change to out doors is too great, and I do not think you will secure the same strength and vitality that you will with the other system.

Mr Brown used this pipe system, and he took it out, and he has returned to the lamp brooder, the individual system. It has a great many advantages; because you have cold air in your brooder house and you can keep the temperature in each individual hover to suit the number of chicks in that hover. The great drawback against this individual system is the labor and trouble of caring for the lamps. He has eliminated the bad air in the brooder by having all the air which supplies the lamps and his hovers come in from out doors and not from the brooding room itself. All the air that enters his brooder is drawn from the outside.

Q. Have you heard of anybody using gas?

A. It is entirely practicable, but poultry plants are generally in out lying places where they cannot get gas. I do not believe in having anything in the brooder against which the chicks can rub such as a hot drum or a hot pipe. The great trouble in all lamp brooder construction has been the lamp. A infinite number of lamps have been made and tried with more or less success especially in out door brooders; the lamp has to be constructed so that it will not blow out. In some the oil gets hot and fire occurs. If you have a short chimney you will get smoke. The majority of out door brooders have the Zenith burners without the chimney. The Zenith burner was the first burner used when they discovered petroleum. The next development used was the use of the chimney. The Zenith burner won't blow out. It has the defect, that no matter how you adjust it the height of the flame changes. Every time you touch that lamp or put any oil in it the height of the flame changes. We manufactured brooders with these lamps for four or five years and then abandoned it.

Mr. Graham: That Zenith burner was on the brooder that burned.

Mr. Nix: The cause of fire in that brooder was because the burner was not properly seated.

Mr. Graham: Can you give me any idea what makes your brooder so economical in oil.

Mr. Nix: You get more heat out of the certain number of square feet of radiation. There is an upward draft in these pipes, and the air passes over the heater and down the channel, and there is a continual swirl of air. You get perfect combustion to begin with.

Q. Why did you put that flange on the lamp chimney?

A. Where you put a lamp in a tight box, the radiant heat from this burner warms the lamp box. The first brooder I built of this type I worked it for six weeks, and I could not keep the oil cool until I put on the flange.

Q. You were telling me once you tried contact heat in the brooder.

A. Yes, there was a great deal of interest displayed in it at the time, and I think the proper idea is to have your chickens heated by radiation.

The little chick under the old hen is in contact with her body, but the little bill is sticking out doors, and the air it breathes is cold air.

Mr. Graham: If you are applying Brown's fresh air method to this brood, you would bring that fresh air into the lamp boxes.

A. Yes.

Q. Why not keep the windows of the brooder house open?

A. That is all right.

Q. Do you think you could raise chickens this weather with the windows open?

A. I do not know.

Q. Do you think it would be wise to get the heat into the boxes or pipe fresh air into the brooder?

A. No, I do not think so; I would open the transom sash. By using the simple wafer regulator in the hover, you can control the temperature.

Temperature of the Brooder.

Heat the brooders from 85 to 105 degrees,* depending upon the make of the brooder and position of the thermometer in the hover. This temperature should be maintained the first week. The second week may be five degrees lower, then gradually reduced as the chicks grow older, depending, of course, upon the temperature outside.

It is all right to use a thermometer but you must first determine the proper temperature from the appearance of the chicks themselves. Just watch them when they settle down for the night. If they are lying down all spread out like sheep on a hillside, happy and contented, with their heads keeping out from under the hover and resting on the floor, rest assured the heat is all right; but, if they are huddled together in a pile, they are cold and need more heat. If they stand up with their mouths open, they are too hot. It is better to have a little too much heat than not enough, as the chicks will work away from the heat if they have a chance. During the night the temperature usually falls, and then if there is a little surplus they are comfortable in the morning. While a regulator is not essential on a brooder, it is of great assistance during the first few days. The heat does not need to be watched so closely, and consequently, the regulator is a time saver. It also provides the proper temperature in the early morning. When there is not enough heat under the hover, the chicks pile up in a lump and the weaker ones are trampled or forced to the outside and chilled. If the hover is not warm enough the chicks will not go under it and will pile up in some convenient corner outside. When brooders are not of the two or three compartment style, the chicks should be confined within a foot or so of the hover the first few days until they become used to it, and the run gradually enlarged as they grow older.

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* Some hovers place thermometer well above the chicks, and consequently require a higher reading of thermometer.

It is a good plan to leave an older chick from the previous brood in the brooder with the new ones. It will act as a leader, and will show the little fellows the water and how to scratch and the way in and out of the brooder. The leader makes a very good substitute for the old hen. When the chicks are old enough, allow them to run out in the open air. It makes them strong and hardy.

Litter.

At the first we advise against the use of bedding materials that are indigestible or that may be eaten, as a little chick is a very foolish bird, and when taken from the incubator and placed in the brooder, will attempt to eat anything it can swallow, and too often it succeeds, for many a flock has been killed by filling up on bran, saw-dust or sand. For this reason do not use bran, saw-dust, coarse sand, or fine shavings. The first choice would be cut clover, next cut straw, barn litter or chaff, sweet and free from mould and decayed particles.

After the first week almost anything can be used. One of the best materials available is dry earth, especially in warm weather. It absorbs the droppings and is a good disinfectant. Bedding should always cover the brooder floor at least an inch deep, and be short enough so that the chicks can scratch in it. Dry chick feeds should always be fed in the litter and every inducement given the chicks to exercise.

In winter, on no account should the little chicks be allowed to run on a bare, cold floor. On the contrary, the floor should always be well littered.

Some chickens will pick each other's toes, and I have seen a chicken deliberately eat another up. They are like little children; they like to feel everything and get acquainted. I think the construction of a chick out of the incubator develops slower than they do under the hen. There is something about the mother caring for the chick that seems to develop the little chick a great deal faster than chicks in the brooder.

What kind of a water can do you use? I use the vacuum can. I believe the little chicks should have water from the time they are put in the brooder, but you should never allow water to get on the feathers. The abnormal thirst in little chicks is caused by improper heat or indigestion. I think it is perfectly right and proper to give them water from the start, and change the water at least twice a day. One of the most important things is to change it at night. The first thing a little chick does when it gets up in the morning is to go and get a drink, and if it gets a drink of this stagnant water it does not do it any good.

Q. How about milk for chickens?

A. That is the best thing you ever fed a chick.

Q. Do you think new milk is the best thing to give little chicks to drink?

A. Yes, I do.

Q. How soon after they are hatched before you put them in the brooder?

A. You can take them out of the incubator as soon as they are hatched. I think after they are all hatched and the feathers are dry, that is the time to take them out.

Q. At what temperature do you give them the water?

A. Cold water. The second period we will call the foolish period. The third is the development of the natural instincts until they cross the danger line, and after the danger line, we may call that the fourth period on the range. Grit is essential and where you are using dry feed, and your feed gritless feeds, put in five per cent. grit.

Q. With the feed?

A. I never put any grit in the brooder until they know what it is. When the chick is hatched out the yolk is sufficient enough to keep it alive for ten days. The chicken will not die from starvation until it is ten days old. The reason I know that is that I have occasionally had a cross-bill chicken or one that had only one bill, and it was practically impossible for them to eat or drink and they lived to be ten days old. Take small fry fish. When they start out they have a little sack of nourishment under the chin which lasts them four or five days. I think nature intends this yolk to supply the chick with food until it gets into good working condition and is able to follow the hen around. The mistake the amateur makes is giving the chick too much food at the start. Only feed them a little; whatever I feed they eat up. For fifty chickens I would give them about a spoonful of grit.

Q. When do you start to feed?

A. When the chickens are thirty hours old. Bread and milk are easily digested, and will not do them any harm. A great many people start chickens on boiled eggs; I think it is better to mix it with bread. If you do not have milk, I think eggs are all right.

Q. How would a little chopped mangels do?

A. I think it would be very good. You can start chickens off on milk and you can use a great many breakfast foods. A great many people recommend lettuce, and some grow lettuce in boxes. Any one that is carrying on a market garden and have a great deal of waste vegetables around the place can use it, and I believe cabbage is very good. When it comes to the second period you still have to continue this careful feeding. Do not let your sympathies run away with your good judgment.

Q. How many times a day would you feed in the second period?

A. Not over three times a day. With the little chick I think it is advisable to feed five times, second period three times, and the third period you can hopper feed. I would be careful about hopper feeding until they are six weeks old. When they are put out in the range, hopper feeding is the first thing to do. The first two weeks is the critical period. If you have not milk you must use beef scraps, curd or cottage cheese, the finest feed you can give your little chicks.

Mr. Elford: If you were going to raise chickens would you build a brooder house with a continuous pipe system, or put in individual brooders, or build colony houses with individual brooders; that is, supposing you were building for ordinary farm condition? The ordinary farmer does not want to raise broilers or roasters.

A. I think the colony system and individual brooders out of doors is the best process of raising chickens. If a person cannot raise chicks in the colony system and individual brooders there is no hope for him.

Mr. Elford: If you are going in for broilers, what would you advise?

A. You have asked me a question that I cannot answer. I would probably try both systems.

Q. Where do you look for the development of brooders?

A. In the pipe system on the individual plan. Where you want to raise a large quantity, the labor problem comes in in the colony system. At the Lodge place in Massachusetts, they have a poultry building 75 feet long and it is nothing but an open shed, 3 feet high behind and 6 or 7 feet in front, and there are nothing but posts in front. They put four pipes in the back end and an ordinary hot water heater, and that hover arrangement was continuous. They have a partition every five feet, and they had that right out in the open field, and they carry in it fifty or sixty flocks. It is best to have fifty or sixty in the flock. I saw an open pipe brooder house in which they had a flock of four hundred, and fed them till they were four weeks old; and then they put them all into one room, twelve hundred of them together. For early spring they had canvas screens to drop down and make it a closed-in shed.

Q. Do you prefer diffusive or radiant system for brooders?

A. I prefer the radiant.

Q. Do you consider bread a balanced ration?

A. For a few days at the start.

Q. I have seen chickens raised on bread entirely?

A. They were on grass, of course, and there you get the three elements.

Q. Should you ventilate the brooder from the bottom or the top?

A. I do not think it advisable to use an up-draft ventilation. You can raise fifty chickens in a house 3 by 6 feet, where you have an open front, and you can carry them through till the fall. If you use a piano-box for a brooder you should have it 6 inches from the ground. Lay the box on its side and knock the bottom out and make a door out of that for a verandah and put a wire over the opening to keep out anything that would destroy the chickens, and cut a hole in the side for the lamp case.

Q. What does that brooder cost?

A. That retails at $6.

The Chairman: I think Mr. Nix has covered the point so well that I do not think it is necessary to sum up. The fry of the fish that has this sac attached swims about for a certain period and when that sac is absorbed the fish begins to take its natural food and that is the critical time with regard to fish. As soon as the fish have absorbed that yolk they immediately become hungry, and if they feed them artificially at that time they ruin the fish. They do not start to feed them artificially till they learn to feed themselves.

Mr. Graham: Before the meeting adjourns I would like to express to Mr. Nix our best wishes and thanks for his kindness in coming up to see us. I am free to admit that when I wrote to him I did not expect that he would come. I know that incubator men are extremely busy, and I realize that Mr. Nix's time is valuable. We are very much indebted to him, and I feel sure that Mr. Nix is one of the best posted men in the incubator business to-day.

Mr. Elford: I take great pleasure in seconding that. I do not think I ever listened to a man who was as well versed in his business as Mr. Nix is, and it is a pleasure to second the motion.

Mr. Nix: I am sure you flatter me. It affords me great pleasure to be with you. A few things up here have given me a great deal of encouragement. This is the first visit I have made to Canada, and of course we outsiders have preconceived opinions. I do not know whether it would interest you to know how you look from the other side. They told me "You will find these people very hospitable," and I can assure you that never in my life did I receive more courteous treatment or more courteous welcome than I have received here. I can assure you that from the bottom of my heart I appreciate it, and while I have tried to contribute my mite to the success of these meetings I feel that I have gained a great deal more than I gave. I will always look back with a great deal of pleasure to my first visit to Canada. I want to congratulate you on some things I observed here. While you, like us, are a conglomeration of people; you have the keenness of the Scotch, the determination of the English, the geniality of the Irish, and the intuition of the French—a combination that is invincible. You do not want to be entertained. You are after information and facts, and I like to see it. I wish we had you with us on the other side of the border. Not that we might do you good, but that you might be of great benefit to us. When I look to the Northwest, that undeveloped section of Canada, and think of its possibilities, I feel that you will be a great country. There are a great many people in our country who want to rise over the shoulders of others or use others for stepping stones; but I find in this country that you are willing to help as well as to be helped, and I wish that we had more people like that in our land. Just now we are suffering from the exposure of grafters, and we need to return to the old-fashioned principles of common decency and honor, and I wish we had you to help us in this work. (Applause.)

The CHAIRMAN: We all appreciate very much indeed the very kind words Mr. Nix has seen fit to express about Canada. I can only say that it is an easy thing for a Canadian to extend hospitality to such a gentleman as Mr. Nix.

OUR POULTRY TRADE.

BY F. C. ELFORD, CHIEF OF THE POULTRY DIVISION, OTTAWA.

I have been very much pleased with this Poultry Institute. I believe, as most of the men who have addressed you do, that there is money in poultry; the secret, of course, is to know how to get it out. That is what we are here to learn, and I believe a great many of us will go home fully persuaded that poultry keeping is a science that demands a great deal of careful thought and study. I believe the time has passed when any person can raise poultry. Sometimes I get annoyed when I receive letters from people reading something like this: "I have been doing so and so, but I did not make a success of it; and now I would like to turn to the poultry business, and I am quite satisfied I can make money out of it." That is not the kind of people we want in the poultry business. We want the very brightest men and women we can get in the country. If they have not got common sense and intelligence to mix up with the feed they give their poultry they had better stay out of the business and go at something a little easier.

My subject to-night is the poultry industry of Canada. It is a pretty big subject, but not near as big as it is going to be in the next few years.

By way of introduction, I want to give you a few figures to show where we stand in reference to the poultry business. According to statistics, we have about 17,500,000 head of poultry in Canada. For the last ten or fifteen years our poultry has increased about 380,000 yearly. Water-fowl and ducks have remained about the same for ten years. In fact water-fowl have lost in the last ten years about one thousand head, and the turkeys have increased enough to just about make this up. In 1901, our last census year for the Dominion, we produced 84,000,000 dozen of eggs which sold for $10,250,000, or an average of twelve and a half cents per dozen, and in 1901 we sold $1,250,000 of dressed poultry. That does not look very much compared with the poultry industry of the United States. They produced three or four billion dozen of eggs last year, and if they were put side by side they would reach twenty-five times around the globe; but when we compare ourselves with the Americans per head we are so very far behind. We have three hens per head of the population, and they have three and a third. Presuming that two-thirds of the poultry we had in the year 1901 were laying hens, we average about ninety-one eggs per hen and the United States average about one hundred eggs per hen; but we receive for our ninety-one eggs more money than they received for their hundred. As Dr. Johnson, of Ottawa, puts it we received the same money and saved the old hen the trouble of laying the extra nine eggs. Their eggs in 1901 averaged them eleven and one-seventh cents per dozen. That is all I will say in reference to the poultry we had in 1901. What have we done with it? Ten years ago we exported twenty thousand dollars worth of eggs. Two years ago we exported two hundred and thirty-eight thousand dollars worth of eggs, and in 1904 we did not export much over, if all that. What is the matter with us? Two years ago we exported to the old country $238,000 worth of eggs, and last year we did not export one hundred and forty thousand dollars worth. Is that something to be proud of or not? I claim it is something to be proud of. And why? It is not that we have not produced more poultry, or that it was not good enough to send to the old country. We have produced the poultry, and produced it so well that it has been sold in our own country, and we have only had $140,000 worth to ship to the old country. We have been selling our produce upon our own markets instead of having to send it across the water. In 1904 we sent a little over 5,000,000 dozen of eggs across the water, and we received for them $714,000 dollars, or an average of thirteen and eight-tenths cents a dozen. In 1904 we shipped not many more dozen, but we got for them over a million dollars, or an average of eighteen and a-half cents a dozen.

How do we stand in reference to the price with the other countries that ship to Great Britain? The average price in England for eggs in 1904 was sixteen and one-fifth cents a dozen, and Canadian eggs brought eighteen and a-half cents. It may be true that we have come to the limit in Canada, and that unless we ship to the old country there will be a glut in our own market, and therefore it is a gratification to know that we have been receiving a good price for our eggs in the old country, and that the old country people are willing to pay for our eggs a better price than they do for the average eggs that comes on the market, and I think that ought to be an encouraging feature for the producers in Canada.

A MEMBER: Was that the average price we got for eggs, or the price paid in the old country?

A. That would be the price paid in the old country. Russia sent to the old country eggs to the value of $68,000,000; Denmark, $38,000,000; Germany, $31,000,000; Belgium, $13,000,000; France, $16,000,000, and we sent $7,000,000 worth. Now, compare the difference between our shipment and other countries, and look at the future there is for us in that country.

I think we must continue to look to the farmer of the Dominion of Canada for the production of eggs, and we must look upon the farmer as the backbone of our poultry industry. We have had a number of poultry specialists started up. They have put three or four or five thousand dollars in the plants and have probably lost it all, and when you consider how and under what considerations these plants were started it is no wonder that they failed. I do not say there is no place here for the specialist in the poultry business, but I do say it is to the farmer we have got to look for the future of the poultry industry, and if that is the case there are some things we have got to advocate and practise, and I think many of these things have been brought out in the talks we have had during the last few days. I might repeat some of them.

I think in the first place this subject of labor has got to receive a great deal of attention. It has become so that the price of labor must necessarily enter into our calculations in connection with our poultry industry. If we could get a dollar from our hens with half the labor we at present expend upon them for the same return we are in duty bound to get that dollar in that way.

How are we going to decrease the item of labor in connection with our poultry productions. I think a great deal depends upon our poultry houses. I do not advocate expensive houses, but I do believe we must have houses that are more convenient and easier to clean, and I do not believe we should leave the houses six or eight months without cleaning. I attended an Institute meeting with Mr. Jarvis who used to have charge of the poultry department of this Province, and he said, "If you only got into the way of cleaning out your house, a few minutes will do it—" and a woman jumped up and said, "I take exception to that. A few minutes won't clean out a house. I have lived on a farm for the last thirty years, and my experience has been that it has taken from six to twelve months to clean out our hen house." If our hen houses were a little more comfortable we would secure more money, and if we have to buy our feed we should buy it more judiciously; and I believe it is just here that the farmer is going to have the advantage over the specialist. He grows his feed at first hand, and he feeds it without other people having any profit on it, and he also feeds a great deal that would otherwise go to waste if it were not for the poultry.

I do not think it is fair for a man to start up with one hundred hens and saddle upon that one hundred hens the cost of incubators and brooders and colony houses—say five or six hundred dollars worth of plant—and make each hen pay interest on five or six dollars. A hen will get along in a cheaper house. I know houses that have cost from eight to ten dollars per hen, and other houses that have given just as good results have only cost from one to two dollars per hen. I have known men start in the poultry business who have taken a catalogue of some manufacturer and ordered such stuff as they wanted, when a great deal of this stuff could easily have been made by themselves. I do not believe in a man making an incubator, but I would far rather make a hopper or a little trough of my own or a shipping crate than to buy it. These things could be made during the winter months. I believe there are many women who are running poultry plants who do well, and who know how to use a saw and an axe. It would shame some of us men to see what nice work these women can turn out.

We must endeavor to utilize all the by-products of the farm. Let us put our heads together, and try to see if we cannot make our poultry less expensive, and show a balance on the right side of the account. I am not going to say very much as to the advisability of crate feeding, because that is a pretty old story now, and there is no person that does not believe it pays to feed their cockerels before putting them on the market.

One of the produce men in Montreal told me last fall that a farmer came to him and said that he had three or four hundred Barred Rock cockerels that weighed six pounds each, and he wanted to sell them. The produce man said, "These are just what I want. I suppose they are fat?" The man said, "Yes, I think they are. I have fed them a shovel full of oats once or twice a week, and I think they are fat enough all right. They are roosting in the trees and I want to get rid of them." The produce man said: "I do not want them, I would not take them at any price. But if you will go home and feed these cockerels for three weeks according to the directions you can get for crate feeding chickens, I will guarantee to give you from $1 to $1.25 apiece for them."

Many farmers say, "I am willing to fatten, but I do not want the bother of killing and fixing them for the market." I think it is a shame the way our goods are put on the market. A man will come along to the country storekeeper with ten dozen of eggs, some of them gathered a week ago, and some ten weeks ago for all they know, and yet that man gets the same price for his eggs as you get for absolutely fresh eggs. I think there should be some co-operation between the producer and the consumer. It is not fair that the producer should expect the same price for old eggs as fresh ones, and I believe something ought to be done in the way of assisting farmers to market their stuff to better advantage. I believe we could have some such system as they have in Denmark, where six, twelve or one hundred farmers would guarantee to put up their eggs, and bring them to a central market, and their dressed poultry or live poultry and let it be killed and dressed at this central place if they wish.

Some few weeks ago I took the privilege of writing to every produce man that I knew handled a considerable amount of poultry, and asked him what he thought of just some such work as this. I want to read you the letter I wrote him:

Dear Sir,—It has been suggested that the poultry industry might be benefited by the establishment of co-operative poultry circles throughout the country. The plan upon which the circles would be conducted is about as follows:—

"At a central point establish a station in charge of a manager who would instruct farmers throughout the district in breeding, rearing, and fattening poultry according to the best known systems, and to gather and care for eggs with a view of putting them on the market in the best possible condition. Both fattened poultry and eggs would be sent regularly to the central station, the manager of which would prepare, grade and market them to the best advantage.

"I would ask you to forward an expression of your opinion as to the extent such an arrangement would assist the industry as follows:—

1. In the production of a more uniform and improved quality of dressed poultry.
2. In providing a more reliable supply of fresh eggs.
3. In obtaining prices consistent with the quality of poultry products.

"I would appreciate your valued opinion on this matter. Thanking you in anticipation, I am,

Yours truly,
Chief of Poultry Division.

About 60 per cent. of them answered, and there was not one reply that did not think favorably of such a scheme. Eighty per cent. of those answering were most enthusiastic, and some of them said if they could have such a scheme it would simply mean a revolution in the poultry industry.

The people who buy poultry from Armstrong Bros., Fergus, tell me that they would pay several cents a pound more for the goods than they would if they bought it from individual farmers. The farmers get better prices, and Mr. Armstrong gets a fair price for handling it. It is also claimed that if we had some such circles as this we would get a more uniform article, and we would secure better prices than we do at the present time, and I would like to ask what you think of such a scheme as that. Is it feasible?

A MEMBER: I think it is.

MR. J. W. CLARKE: It was in Toronto at the time of the Fruit, Flower and Honey Show, and I visited a number of produce merchants, and I think 80 per cent. of the poultry sent in there is not up to condition. One produce man told me that hundreds and hundreds of birds died in the shipping crates. There were not enough people in the business in Toronto to pluck them, and they simply died in the crates.

MR. ELFORD: Do you think a system of that kind would secure a more uniform class of dressed poultry?

MR. CLARKE: It certainly would; there is no question about that.

MR. ELFORD: In your experience do you think the farmers would rather dress their own poultry and put it on the market?

MR. CLARKE: Yes.

MR. RIELLY: My experience is that farmers would sooner sell them alive than kill and dress them. I think you would have to go much further than you propose. I think you would have to have some system of sending a wagon around to collect.

A MEMBER: It could be done in connection with the cheese industry. That is what they are doing in Denmark.

MR. GRAHAM: Two or three creameries in Western Ontario are going to try it this summer.

A MEMBER: I think a scheme of that kind would be beneficial. The farmer is afraid to go more extensively into the poultry business, because he is afraid he cannot get a market.

MR. GRAHAM: There are a number of farmers in this section who come to me annually, and have me ship their birds for them, and I put them in a box, and send them to Montreal. They seem to think if I ship them I will get the money, but if they ship them they would not get it.

MR. LACHANCE, Chicoutimi, Que.: That is what I have to do.

MR. ELFORD: Do you think that if you took a scheme like that in hand, that the farmers in your immediate neighborhood would let you ship the goods for them?

BROTHER LIGOURI: Yes; we could arrange it that way; but they would need a lot of teaching and instruction before they would do it.

A MEMBER: I think the dealer would make enough money out of it to make it worth while to teach these farmers.

MR. GEORGE ROBERTSON: We are in about the same position in the fruit industry, and we feel a lack of co-operation. Of course fruit is more perishable than poultry, and we feel that in order to improve the industry we will have to have more co-operation. I think we will have to establish these central stations, and have an inspector at each station to see that the fruit is in proper condition to be shipped.

MR. ELFORD: I believe such a system as this would have a tendency to induce old country firms to establish a Canadian agency. I believe that is the solution of our old country trade. Let them buy the birds on this side of the water. They are doing it now in individual cases, and they will do it more just as soon as they find the stuff is here. One English produce man advertised here a year or two ago that he would take one million pairs of fattened chickens, and there are dozens of merchants who would do the same thing. I have had letter after letter from old country firms asking, "Can I get anywhere from one to twenty tons of dressed poultry, and at what price?" I must confess my conscience hurt me when I endeavored to put a price on poultry, but I was a little surprised when one man said, "It is not a case of price at all; I have got to have the goods." I believe that if we do not have the old country firms establish Canadian agencies, we will have to have inspection the same as in fruit. Not many years ago one firm in Canada shipped stuff to the old country that did more harm than a good firm could undo in two or three years, and I have had letters from firms saying "We do not want any more Canadian goods." It ought to be a criminal offence for a man to do such a thing.

There is work for the fancier in this country. There is work for the man who pays attention to the marketing of poultry. There are 17,500,000 head of poultry in Canada, and out of that there are only 80,000 pure-bred stock. Think of the opening there is for the fancier. But the fancier must understand that people are beginning to discriminate, and that he cannot any longer sacrifice vitality and egg production for beauty points and feathers. I have known fanciers to say, "I do not want a hen that lays an egg. I want a hen that won't lay because she makes me the best show bird." Men are in the poultry business to-day not for the fun there is in it, but for the money there is in it.

DEFINITENESS IN AGRICULTURE.

By C. C. James, Deputy Minister of Agriculture, Toronto.

This Poultry Institute is certainly a sign of the agricultural times. Twenty years ago when we started to develop this institution we little dreamt that the time would so soon come that we would be able to gather from different parts of the Province a group of men and women such as we have here to study, day after day, that one little subject, the poultry business. The little poultry industry has become a great, big poultry industry.

The agriculture of this Province has gone through a great series of changes. It is different from what it was ten years ago, different from what it was forty years ago, very different from what it was seventy-five or eighty years ago, and ten or fifteen years from now we will have questions brought before us quite different from those we now have. We have gone through three or four different epochs, and we can almost trace the exact period when we changed from one condition to another. There was for instance, the pioneer condition when the farmer went into the woods and started to cut out for himself a home in the forest. In those days he burnt up the brush and sold the potash and that was the first article sold from the farm. After a while he was able to sell the timber, then he was able to sell some grain and so he developed from ashes to wood and from wood to grain. Then there was the coming in of the live stock, the introduction of horses and cattle and sheep, followed by the development of our great dairy industry. And now we have the North West Provinces, growing millions of bushels of wheat, and we are once more trying to adapt ourselves to new lines. We have to sit down and take stock of our business. We cannot compete with the North West in the production of wheat, and if we are going to hold our own in the production of live stock we have to specialize. In the shipping of bacon, butter, cheese and eggs to the old country we have to compete not only with other countries having cheap lands, but also with countries of the old land where the farmers have been trained in the business for a great number of years. Bacon, butter and eggs are about the only three things the Danish farmer produces—these are his specialties. We have to compete also with Russia, South America and New Zealand. The possibilities of increase in Ontario production are wonderful. We can double, treble and quadruple almost any line of production. We have in Ontario one hundred and seventy-five thousand farmers and it would not take very much effort for them to produce on an average $100 worth of poultry a year, and that would give us 17½ million dollars in poultry and eggs. Take the apple production, one hundred and seventy-five thousand farmers, and yet only here and there you find an orchard that is being properly taken care of, and only here and there you find a farmer having in his orchard trees of the right kind. If we had all the apple orchards in Ontario planted with good marketable varieties, the trees properly cared for and properly pruned and the orchards properly cultivated and fertilized we might produce every year in Ontario from ten to twelve million barrels of exportable apples. It seems to me that we should sit down and examine our agriculture farm by farm, township by township and section by section, and determine what are the undeveloped assets of the farming community, and then begin to develop them as much as possible.

We have developed the Agricultural College, and through it we have organized the Farmers' Institute, and now through this the Poultry Institute we are inaugurating a new line of work in connection with poultry. Our Farmers' Institutes have been carrying on work of general instruction, but we have come to a point where the future work depends on specializing, and instead of having general Farmers' Institutes we will soon have Poultry Institutes and Live Stock Institutes and Dairy Institutes, and through these we hope to see a new inspiration for advanced agricultural work along many lines.

The ideal system would be this: if we would gather at the College every year a thousand young men, put them through this institution and then, having them well trained in the practice of agriculture, distribute these young men with a love for their work all over this country, each one of them a centre of inspiration and instruction, what a revolution that would make in our methods. That cannot easily be done; that is an ideal. But supposing instead of a thousand young men we send out only a few half dozen and they were to go out, one here and another there, each one acting as sort of commissioner for his section and organizing ten to twenty-five men into a poultry circle, we would get the thing started. Mr. Elford has told you what the poultry men need, and Mr. Robertson has told you that is what the fruit men need, and the live stock men say that is just what they need. It all means that this country is in dire need of organization and co-operation. I can take you to two or three places where co-operation work in fruit has started and it is coming on well. You must start the work yourselves, and then you can ask the Dominion Department of Agriculture or the Ontario Department of Agriculture to help you, and they will. Go home and start the work, get about you a group of men having the one object in view, and this Institute will only be the beginning of many poultry institutes that will be held in this Province. (Applause.)

IS POULTRY-KEEPING PROFITABLE?

By L. H. Baldwin, Deer Park.

We have been discussing at this Institute meeting different branches of the work connected with poultry raising. I think that it is best that I should now deal with the matter now more in a general way. My subject for the evening will, therefore, be, speaking generally, "Is Poultry-keeping Profitable; or is it a Losing Business?" So many ask the question, "Does poultry-keeping pay," and we have heard from our good friend Mr. Hunter some reasons why poultry farms fail. There is no enterprise that lends itself more readily to a very attractive prospectus than poultry-keeping. In theory it is simply a gold mine; but in practice it does not always come up to our expectations. We must face the fact that poultry-keeping is just like any other commercial enterprise with its successes and its failures. We know of men here and there who are not only making a good living, but who are laying by a good many dollars; while others retire after but a short and painful experience. Successful poultry-keeping must always depend upon the industry and ability of the man who undertakes it. Again, when we are asked the question can you make a living out of poultry? I would say that so much depends upon what constitutes a living. A living for one may be a struggle for existence with another. It certainly requires ability and energy to carry poultry-keeping to success.

To maintain a large plant we must raise a large number of chicks every year. How is this to be done, by natural methods or by artificial incubation? The chicks must be raised in sufficient numbers and at reasonable cost in order to allow a fair margin for profit.

It has always seemed to me that it would be an immense undertaking to raise thousands of young chicks by the natural method, and it would be very interesting to see how it can be done economically. I believe it is done in the Rhode Island district, and I think it would be a very good thing if our progressive Government would undertake to show us how it can be done at some of their Experimental Stations; or by getting someone who can deal with it in that way. For the present, however, we look to artificial incubation as necessary upon any large plant. The artificial method of hatching chicks by incubators is successful in some hands and not in others. We have a lot of information yet to obtain before we can look for anything like satisfactory results from artificial incubation with any degree of certainty. As Mr. Nix has told us, we are only beginning to find out what little we know about artificial incubation. For my part I do not think that we can estimate too highly the results of co-operative experiments made by a number of intelligent, enthusiastic, and earnest men who are determined, if possible, to make the business of poultry-keeping a success, and all reports upon artificial incubation sent to Mr. Graham are of material assistance in arriving at some conclusions in regard to the matter. A manufacturer may produce a very saleable article in very large quantities, but if he finds that the cost of production has been too high, that it leaves no margin for profit, he must abandon his business; and so it must be with poultry. We also know that a manufacturer who distributes his energy over several lines will find that one particular branch pays better at one time than another; and this is no doubt true of poultry like any other branch of farm work.

Poultry raising should be looked upon as a substantial part of the work on a general farm. The question is, how can a farmer make it a substantial part of his work in co-operation with the other branches farming or with fruit growing. I doubt very much if you can find any article produced for consumption that is more saleable than poultry products. From my experience in dealing with poultry in the city of Toronto I can say without any hesitation that when you come to deal with the first-class trade of a large city, and you produce the very best article of its kind—be it a fresh egg, a broiler, a soft roaster, or a spring chicken—you will find no difficulty in disposing of your produce at a high price.

Now, the question of raising a sufficient number and making the business pay depends upon a number of facts. There is the question of the cost of feed, the cost of labor, and the cost of plant; together they constitute the cost of production. I think that we have taken a long step in advance at this Institute meeting when we have learned that we can build hen-houses at a very much smaller cost than has been considered necessary; but we have yet to deal with the too large mortality with the chicks, which so increases the cost of producing those that survive.

When I first took up poultry as a hobby I determined that I would only hatch by artificial methods, as some had said that if you rely entirely on incubators you will find that the vigor of your stock will peter out, and so I used only artificial methods of incubation in order to test the matter. From year to year I rigidly used the axe as the only medicine in my poultry yards, and from season to season I saw my stock increase in vigor, and the quality of my poultry both for producing eggs and for table purposes improve, till I had a demand far in advance of my supply, and I concluded that hatching by incubators was quite satisfactory. I then hatched and reared a fair proportion. After several years' experience I ventured on a larger scale, and while I for the first year hatched under the same conditions as formerly I raised my chicks upon another portion of our property, and I had that year an excellent flock of chickens. The next year I operated my machines in an incubator cellar built upon the most modern plan; but that year (1904) the mortality among my chicks was very great; so large as to wipe out any possibility of fair profits. I wrote to my good friend Mr. Graham, and he gave me all the encouragement he could by saying that the trouble was universal. The spring of 1904 was very wet, and I put my loss down as possibly due to the very unfavorable conditions for brooding. In the spring of 1905 I both incubated and brooded under the same conditions as in 1904, and I ran into the same trouble. It did not seem to matter what I fed, the result would be about the same. Fortunately I had made a practice of keeping charts with a very complete record of the conditions under which I operated my machines; showing the temperature of the incubators, the temperature of the room; and the relative humidity of the air of the room, and I cannot be too thankful that I now have these records by which I can make some comparisons. For instance, under my former conditions when I was most successful, I find that the relative humidity would only average about 60°; while under my new conditions I had it as high an average as 81°. A difference of over 20°. I think that there is something here for us to consider. Another point to bear in mind is that under my former conditions I only ran two or three machines in a room having over 5,000 cubic feet of air space, while in my present incubator room I ran six machines in a room having less than 2,000 cubic feet of air space. We have been making some further investigation, and we find from medical science that where there are foul conditions in the atmosphere the ill effects upon human beings is not so apparent until the relative humidity goes above 75°. May not the same be true with regard to incubation under such artificial conditions as we operate our machines, and that defective incubation results in chicks improperly developed, which may account to a great extent for the high mortality of the chicks? We know from personal experience that while we feel quite comfortable outside with the temperature at 60°, we feel our rooms cold at the same temperature when our houses are artificially heated and the humidity very much reduced. Which may suggest the conclusion that while we may find the temperature upon the eggs under a hen to be about 100° F., that in an incubator with the humidity so much reduced we must keep the eggs at a higher temperature; that is to say that the temperature under the hen under natural conditions may not be an accurate guide for an incubator under artificial conditions.

Q. Did you have trouble with the early hatches of 1905?

Mr. Baldwin: It is not so apparent in the early hatches. I had a hatch on the 14th of March last year in which I hardly lost a chick; but the trouble began about the middle of April when I had a lot of incubators running. I think that as you increase the number of incubators, and with them the relative humidity increases, it decreases your chances for success. However, I feel satisfied that when we know what are the right conditions under which to operate our machines we can hatch successfully, and that with careful observation we will yet overcome this difficulty in artificial incubation. The effect, then, in hatching chicks that are improperly developed is that the mortality is too high, making the cost of producing those that do survive too high to allow the fair margin of profit required to make the business profitable.

I believe that the difficulties in brooding chicks are attributable more to defects in incubation than to methods of feeding or brooding. When the difficulties of artificial hatching and brooding are successfully overcome, I have no doubt that poultry raising on a large scale will be found to be profitable. We are in a fair way, I think, of solving the difficulties, and with some pluck and determination we will in the end succeed.

IMPROVING THE CONDITIONS OF THE POULTRY INDUSTRY.

This closing session of the Institute took the form of a conference among the members as to the best method of improving the poultry industry of the Dominion.

Mr. L. H. Baldwin occupied the chair and invited any suggestion that would tend to help along the industry.

Moved by J. W. Clark, Cainsville, seconded by J. R. Riley, Montreal, "That this meeting do express the opinion that from the very successful sessions of the first Poultry Institute much practical good will follow, and that in the opinion of this meeting great advantage will accrue to the poultry industry by the holding of similar meetings annually, and that we do express our great appreciation of the successful efforts of the Department of Agriculture and the authorities of the Ontario Agricultural College in advancing the cause by inaugurating this Poultry Institute, and that a copy of this resolution be sent to the Minister of Agriculture and to the President of the College." Carried.

Mr. George Robertson, President of the Experimental Union: I am a strong advocate of the trap nest system. This meeting is just a start and I think success will come with next year's meeting.

Mr. Graham: I will try and tell you some of the experiments we expect to carry on next year, and I will put them on the blackboard in order that you may take them home with you, so that you may help us as much as possible in the work. I have had charge of the experimental work here for six years, and the fact has been impressed upon me that a great deal depends upon the man who is doing the feeding. One man might make a success of dry feeding or mash feeding, because he would follow out the details to the very last point, and if you do not attend to the details you will be sure to make a failure. We are going to try the dry feeding and mash feeding this year. Before Ontario will become a great poultry Province, we will have to solve the labor problem. One of the main points in raising chickens is that you must figure out the number of pounds of grain it takes to produce a pound of poultry, and I believe you can produce a pound of poultry with as few pounds of grain as you can produce a pound of pork, and a chicken will yield with its entrails about fourteen cents a pound, and pork sells for about nine cents per pound with the entrails out. If this is a fact, there must be heavy loss somewhere, or poultry keeping would pay better than it does. I think the whole question is to carry enough chickens at reasonable cost. It is the question of how many eggs you can get, and how much time it takes to produce a chicken. I firmly believe that it has cost too much for oil to grease the wheels that keep the car moving. The production of the animal is all right. We are going to try dry feeding with both hens and chickens. I expect to set one hundred hens, and have them with chickens in individual coops. In one coop we shall give them mixed hard grain food, and put it down in front of the coop, and then we shall start and feed another coop according to Mr. Nix's plan, giving them bread and milk, and feeding them frequently; and then to another lot we will give hard grain and no soft food, and to another lot ground grains and bread and milk. We shall hopper feed some when they reach the age of three weeks, and then we shall try some with soft food all the way through, and we shall try the same experiment with incubator chickens. I hope to find whether whole milk has any superiority over skim milk, and whether sweet skim milk is better than sour skim milk. I also want to find whether whey is a good food for little chickens, and also to feed some upon meat scrap, animal meal and blood meal. This is just an outline of what we are going to try to do. Mr. Terry is the best experimental feeder I ever had on the place.

Mr. Elford: I do not know that I can add a great deal of light. I think there are a great many ways in which we can put the ideas of which we have gained here into practice, but the most important thing is to go home and do something. I know it is very easy for us to come here and listen day after day to the practical ideas we have heard, and think, "Yes, it is a good thing, and I would like to do this and that," and then go home and wait for the other fellow to put it into practice. I believe each one of us knows our own condition, and we know the ideas we can hope to carry out and the ideas we can put into practice. I believe that if each one of us would say what we are willing to do so and so, and go home and do it, we would arrive at something tangible. Poultry circles are something I have given a great deal of attention to this last year. The idea is that of assisting one another in the marketing of our goods. I do not know that it is necessary for me to give very many of the arguments in connection with it; but those of us who live in the country, away from central markets, know how hard it is to put our eggs and dressed poultry on the market in the best possible condition. I believe this system of putting on the market an indiscriminate lot of eggs or dressed poultry, and getting the same price for it, is one of the worst features we have in connection with the business. I believe we can have not only a much more excellent product and a more uniform one, but that we can get a still better price by doing the business in a better way. The idea of poultry circles is this: supposing every one of you here would go home and think the matter over and say, "There are ten or twelve farmers in my neighborhood; I will get them interested in the poultry business, and get them to try to do better. We all take our goods to the country store and take out trade, and the goods have got to go through his hands, and then the shipper's hands, and then the purchaser's hands before it gets on the market. Instead of doing that we will send it to a central point at certain periods and have it shipped direct to a good market. And if I send ten dozen eggs, I put my number or letter on them and they are graded at the central station and sold according to their grade." Many farmers say they are willing to feed their chickens in the crate, but they do not want the bother of killing them. They could bring their live birds to the central station, and have them killed there, and they could be put in crates and shipped away in good condition, and in that way the produce dealer will get a more uniform article and of a quality that will find a ready market. Mrs. Dawson was telling me yesterday that the Dawson commission firm got in three thousand chickens the night before Thanksgiving and they were nothing but skin and bone, and nobody wanted them.

Mrs. Dawson: We had to feed them two or three weeks before we could kill them.

Mr. Elford: Armstrong Bros. of Fergus told me that they could make a good profit each year out of the business, and I believe the sooner we take this business up in earnest the better it will be. Mr. Mallon tells me he has been in the habit of getting the Armstrong poultry, and he said he would rather pay him a few cents more for the same quality than if he had to get it from the farmers, because in the first place he could do business easier with Mr. Armstrong than he could with fifty farmers, and it all comes of uniform quality, and the people soon begin to know the brand, and are willing to pay more for it. There is a great deal in this poultry circle idea that should present itself to every thinking person here this afternoon. (Applause.)

Mr. Nix: I want to give you a plan that has been adopted by an individual in Western Pennsylvania. It is in a community where they did not raise enough poultry to suit him, and he has proposed and set about interesting farmers against their will. His plan is to establish a central hatching place of his own. He proposes to take eggs from the farmers and convert them into chickens. He will deliver so many chickens for so many eggs, and he will allow them to raise and give them a certain stated price in full for the product, and if they do not want them he proposes to put up a larger brooder house and carry them past the danger point, and then send them out to the farmers to handle them, and the farmers will take the chickens under these conditions. If they do not want to crate feed them he will take the product in the fall and finish them himself and market them. He is going to compel the farmers to raise chickens even against their will.

Mr. Riley: I would suggest that Mr. Elford get out his plan on paper. Let us have rules for this co-operative plan, or some plan for a poultry circle, and put the matter in shape, so that when we go to see a farmer we can leave him one of these circulars. I think that would be a step in the right direction. I understand that in Ireland they have a system of collection.

Moved by Mr. Riley, seconded by Mr. Robertson, "That it is the opinion of this meeting that the co-operative system applied to the proper marketing of poultry products could be adopted to the greatest possible advantage. That we would respectfully urge upon the Dominion Government to examine into those successful methods adopted by others along this line, and give us such information as soon as possible in the form of a circular or bulletin, together with their suggestions for putting the scheme into operation." Carried.

Mr. Foley: I must say that I am very pleased to have been here through this Institute's course. I believe it has been the best thing we have ever had of this kind in Canada. I am sure there is no one here who is interested in poultry, who will not go home feeling better from having been here, and he will put some of the ideas that have been advanced into practice. I believe, to get the full value of this Institute, the work should be divided up into sections, and all members who are here should go home and experiment along certain lines, and then come back and report next year. We have got so full of information that we cannot carry it all, and we will have to divide up. I am perfectly willing to do what little I can, and I can attend to one experiment. This is the first Institute, and it should not be the last. I think before the meeting adjourns this afternoon we should take advantage of this offer that was given us last night, and ask the Government to make this an annual affair. I do not think this should be part of the Experiment Union. I think it should be a Poultry Institute.

Mr. Elford: I think there is one man in connection with this Institute who deserves the hearty thanks not only of Ontario poultrymen, but also of those of the Dominion of Canada. He has been instrumental in bringing about this Institute, and I think he is the best poultryman we have on the continent. That man is Mr. Graham. (Applause.) I think we would be very heartless and show a great deal of ingratitude if we adjourned this meeting without putting on record our appreciation of what he has done for the poultrymen in Canada, and I would move that we tender him our thanks for the work that he has done, that he is doing, and that he is willing to do.

The motion was seconded by Mr. Lachance and carried.

Brother Ligouri: There is a feeling of gratitude that overcomes me, gratitude to the officials of the Government at Ottawa who have invited us here, and to the Station manager of Quebec, and especially a feeling of gratitude to the President of this College, President Creelman, and to Mr. Graham. I have asked myself if there is a country or any association or political body that has done more for the prosperity of the country than has our own. I not only mean the material prosperity of the country, but the building up of a peaceful progressive Canada, the unity of the races, and useful solid agricultural work. I am interested in gardens, but I do not like to see a garden all of white flowers. I would not like it. But when we see in the same garden different flowers and different shrubs, and when we see in the garden the shamrock, the rose, and the maple leaf, and see the powerful flag that was formerly our foe, but which we have learned to love and respect, and when we note that that flag carries in its folds justice and civil and religious liberty to everyone, then we are inclined to teach our children to sing louder and louder, "The Maple Leaf For Ever."

Mr. Graham: I am willing to give you my private opinion of what I first thought of this Poultry Institute. I was thoroughly aware that it would be a good thing if I could get the right men. First I had to convince the President that we wanted it, and then he had to convince the Minister that we wanted it, and the next thing was to convince both that I wanted so much money to run it. But when I tell you they gave me practically a free hand to get the best men, I am sure you will appreciate what they have done for us. It will keep me hustling next year to get better ones. I do not take any credit for doing anything for the poultry industry of the country. That is what the Government is paying me to do, and I consider it part of my duty. And I am very glad you appreciate my efforts; it helps me a great deal to think that my efforts are appreciated. I would like to draw your attention to the situation of this experiment station. We are right in the heart of the fancy trade of Ontario. Many of the men we meet are poultry fanciers. We have got to carry a class of birds to suit them. But in addition to that we are not losing sight of the 200 egg hen that produces chickens with fertility. If I was confining my attention purely to experimental work, I would want one strain of chickens, and I would want 2,000 of them. I thank you for your words of appreciation.

Moved by J. W. Clark, Cainsville, seconded by J. J. Riley, Montreal, Que: "That this meeting does express its opinion that from the very successful session of the first Poultry Institute, much practical good will follow; and that in the opinion of this meeting great advantage will accrue to the poultry industry by holding annually similar meetings; that we express our great appreciation of the successful efforts of the Ontario Department of Agriculture in advancing the cause by the inauguration of this Poultry Institute, and that a copy of this resolution be sent to the Minister of Agriculture and to the President of the College." Carried.

The Chairman: I cannot let you go without thanking you very much for your assistance in helping me to carry the meeting along with some degree of success. You have paid close attention, and it has been a great pleasure to me to preside; and I feel also that it has been a great honor to preside at the first Poultry Institute, and I hope we will have a good many more of them.

Moved by Mr. Riley and seconded, "That a standing vote of thanks be tendered to the chairman." Carried.

The Institute was then declared to be adjourned.

ANNUAL REPORTS

OF THE

Dairymen's Associations

OF THE

PROVINCE OF ONTARIO

1905

(PUBLISHED BY THE ONTARIO DEPARTMENT OF AGRICULTURE.)

PRINTED BY ORDER OF
THE LEGISLATIVE ASSEMBLY OF ONTARIO

TORONTO
Printed by L. K. CAMERON, Printer to the King's Most Excellent Majesty,
1906

WARWICK BRO'S & RUTTER, Limited, Printers,
TORONTO.

To the Honourable William Mortimer Clark, K.C.,
Lieutenant-Governor of the Province of Ontario :

May it Please Your Honour :

I have the pleasure to present herewith for the consideration of your Honour the Report of The Dairymen's Association of Eastern Ontario for 1905; and the Report of The Dairymen's Association of Western Ontario for 1905.

Respectfully submitted.

NELSON MONTEITH,
Minister of Agriculture.

Toronto, 1906.

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OFFICERS FOR 1906.

DAIRYMEN'S ASSOCIATION OF EASTERN ONTARIO.

President—D. Derbyshire, M.P., Brockville.
First Vice-President—J. R. Dargavel, M.P.P., Elgin.
Second Vice-President—G. G. Publow, Kingston.
Third Vice-President—T. B. Carlaw, Warkworth.
Fourth Vice-President—J. H. Singleton, Newboro.
Secretary—R. G. Murphy, Brockville.
Treasurer—Jas. R. Anderson, Mountain View.

Directors :

1. Edward Kidd, North Gower.
2. Wm. Eager, Morrisburg.
3. Lev Patton, Brockville.
4. J. Whitton, Wellman's Corners.
5. Alex. Hume, Menie.
6. H. Glendenning, Manilla.

Honorary Director—W. J. Young, Central Smith.

DAIRYMEN'S ASSOCIATION OF WESTERN ONTARIO.

President—Thos. Ballantyne, Jr., Stratford.
First Vice-President—Eastern Creameries, John McQuaker, Owen Sound.
Second Vice-President—Stratford Group, A. F. MacLaren, M.P., Stratford.
Third Vice-President—Ingersoll Group, John Brodie, Mapleton.

Directors :

Listowel Group—Geo. E. Goodhand, Milverton.
Kincardine Group—Jas. Connolly, Holmesville.
London Group—Robt. Sutherland, Dorchester.
Woodstock Group—John McLeaven, Hickson.
Brantford Group—J. N. Paget, Canboro'.
Simcoe Group—J. J. Parsons, Jarvis.
Western Creameries—F. J. Sleightholm, Strathroy.

Auditors :

J. A. Nelles, London, and J. C. Hegler, Ingersoll.

Representatives to Fairs :

Western Fair, London—I. W. Steinhoff, Stratford, and Geo. A. Boyes, Putnam.
Industrial Fair, Toronto—A. F. MacLaren, M.P., Stratford, and J. B. Muir, Ingersoll.

Dairymen's Association of Eastern Ontario.

ANNUAL MEETING.

The twenty-ninth annual meeting of the Dairymen's Association of Eastern Ontario was held in the city of Peterborough on the 10th, 11th and 12th of January, 1906. The meetings were held in the Opera House, and were all well attended. The Mayor and Corporation, and the business men generally, of the city, did all that could be done to entertain the visitors, and make their stay a pleasant one.

THE PRESIDENT'S ADDRESS.

By D. Derbyshire, M.P., Brockville.

It is a pleasure, Mr. Mayor, to have you in the chair. It always looks well for a city when its chief magistrate takes an interest in the greatest industry that we have in the land.

It is a great pleasure to meet the enterprising citizens of Peterborough, and especially the dairymen of this important section, and I desire, on the behalf of our Directors, to thank you for the very cordial reception extended us; and further, I want to thank your local committee for the assistance our Secretary received in making final arrangements for this twenty-ninth annual convention. Your City Council, as well as your banks and leading business firms, have given generous aid, which assisted us in preparing our programme and advertising this meeting.

We all regret that our Governor-General, Lord Grey, who had promised to open this convention in your fair city, will be unable to do so, on account of the Forestry Convention now meeting at Ottawa, but I can assure all that we have his hearty sympathy in the great work we have in hand of bettering the condition of our dairymen in Eastern Ontario.

With reference to the dairy industry, I might point out that both in the aggregate production and returns realized, 1905 has been the banner year. It is certainly very gratifying that we made about the same quantity of cheese as formerly, and our butter production has beaten all previous records.

Our cheese exports from Montreal for the season just closed were 2,121,101 boxes. I estimate the cheese on hand in Canada at the close of navigation at 450,000 boxes, which would make 2,600,000 boxes valued at $22,000,000.

Our butter exports from Montreal were 573,449 packages, and the estimated stock in Canada is 125,000 packages, so we made in the season 700,000 packages, valued at $49,000,000.

The bacon trade, so closely allied with the dairy industry, amounted to about $15,000,000.

In the above estimates, no account has been taken of our home market, and this must be looked into, especially for butter, for our Canadian people are consuming larger quantities of fine creamery butter each year. Our home consumption in 1905 was about 3,500,000 packages.

You will be glad to know that we received about $10,000,000 more in 1905 than in 1904 for cheese, butter and bacon. It will be noticed that our dairymen produced (excluding condensed milk, milk for our cities, towns, etc.), cheese valued at $22,000,000; butter, $8,000,000; bacon, $15,000,000, and the home consumption was $50,000,000, or a grand total of $95,000,000. We are sending our goods, not only to the Mother Country, but to the Orient as well, and in increasing quantities each year.

We are also making other advancement. Our factories are being improved, and some really first-class ones are being erected, and our makers are becoming better educated. A larger number and better qualified instructors have been employed, and are doing very satisfactory work. This has been made possible by the liberality of our Provincial Department of Agriculture. We had twenty-six instructors besides our chief instructor, and they have done good work, visiting, giving instructions, and attending meetings; so we have given better service to our factories than in any previous year. Our goods have been finer and more uniform than ever before. The Dominion Department of Agriculture has rendered splendid assistance by giving us a regular refrigerator service, not only on cars to Montreal, but on the steamships from Montreal to the British Market; and it has employed inspectors at Montreal and different English ports to examine our goods, and report weekly to our Dairy Commissioner at Ottawa, the temperature of our goods on arrival at destination. This has been of great importance to dairymen, for the goods were never before delivered to their ultimate market in as fine condition. We want this refrigerator service enlarged and improved, as well as our transportation facilities, so our goods the coming season may be landed in perfect condition.

The watching of our goods arriving at Montreal, as well as the different ports on the other side, is working well, for they do not now lie around on the docks, but are quickly taken care of. The erection of two large warehouses at the Surrey Commercial Dock, fitted up with cold storage, at London, is of great importance. Our goods are taken from the ships and immediately placed in these warehouses. Bristol is coming to the front with new docks, and other ports will have to do the same or lose the trade. So, you see, the result is that we have made finer goods, and then delivered them in better condition, thus receiving better prices and increased demand. With the improvement in trade in every line, and high prices assured, we should do very much better in 1906, and I ask for your hearty co-operation in building up the dairy industry.

While we have such a splendid season, I think this would be a good time to urge all makers to attend our Dairy School at Kingston, which has been greatly enlarged and improved, with a competent staff in charge, where the latest and best instruction is given. I would like to urge all factories to join our syndicate system, and assist us to make a uniform high quality of goods everywhere in Eastern Ontario. While a large number of factories are good and well equipped, we still have a large number not fit to make cheese in, and where the finest goods cannot be made. We must improve our factories, for no business in Canada rests on a more solid foundation, and why our factories should not be first-class buildings, well painted, clean and tidy, with proper drainage, no one can explain. Why should shade trees not be planted, and the grounds around the factory made beautiful? Possibly I can explain why: because the makers of our chese are the only ones that are not properly paid. A large number of our best men are quitting the business. While the milk producers are prosperous this last year, our manufacturers are poorer, having more to pay for labor, fuel and furnishings. Why not give them one and a quarter cents for making, and demand better boxes and a better service. We appoint a committee to report on licensing factories, and I hope their report will be favorable, so we can demand a good factory or close it up.

The *Canadian Dairyman* has been doing good work, showing up some of our poor factories, and I trust it will continue to do so. This is our official organ, and every dairyman should take it. With our past experience, with the full knowledge that the production of cheese, butter, and bacon is the one industry exactly suited to Eastern Ontario, all our energies should be directed to improve the quality and increase the quantity of our goods.

And now, gentlemen, with our present opportunities for education and instruction, there will be no excuse for having an ordinary maker, for they are dear at any price; or if having an old open factory resting in the mud with no drainage, or not having modern machinery, or not delivering your cheese to the station in clean waggons with proper covers to keep the cheese or butter clean, or not doing everything in your power to make the watchword for 1906 "Cleanliness and improvement all along the line."

I have looked forward to this twenty-ninth annual convention to be held in your enterprising city with great pleasure. Your schools, your churches, and public buildings are very handsome; your press, bankers, merchants, and manufacturers are up to date; and I predict a great future for you. Our business here is to bring prominently before your minds our great national industry, and I trust we will have a profitable time.

Once more let me urge hearty co-operation in Eastern Ontario among all our dairymen, and I invite you to make one supreme effort the coming season and take hold earnestly and make the needed improvements, so we can step right out of the way of any of our competitors, by making and placing on the market regularly the finest goods in the world. We can do this by all working together.

COMMITTEES.

The President then appointed the following committees:—

Business—Mayor Best, Warden Buck, R. R. Hall, M.P., T. E. Bradburn, M.P.P., and R. G. Murphy.

Nominations—J. R. Dargavel, M.P.P., Wm. Eager, and James Whitton.

Legislation—Edward Kidd, R. G. Murphy, R. R. Hall, M.P., T. E. Bradburn, M.P.P., J. R. Dargavel, M.P.P., and Wm. Eager.

IMPROVEMENT OF DAIRY HERDS.

By C. F. Whitley, Central Experimental Farm, Ottawa.

The question may be asked: Is there any need or room for improving our dairy herds as they at present exist in Canada? Are the cows producing as much and as good a class of milk that they cannot do better? It seems to me that every dairyman will answer at once that there is decided room for improvement. Hence the action of the Dairy branch of the Department of Agriculture in undertaking the work, which will enable the farmers to see what is being done by other farmers and for their own encouragement.

In 1904 some work was undertaken in the neighborhood of Cowansville, Quebec, where we had a number of cows tested. Last year we took this up at seven different centres, four in Ontario, two in Quebec, and one in Prince Edward Island, with 118 herds and 850 cows. The following charts give you an idea of what was done at Mountain View, where 133 cows averaged 934 pounds of milk apiece. You will notice that the average from one man's cows was 701 lbs., and the next one 1,121 lbs. If this first man's cows were equal to the other's, he could have made just $50.40 more. You will also notice one man's cows running 4.0 and one 4.1 per cent. of fat, and there is another lot down to 3.1 per cent. The highest yield of one cow for thirty days was 1,250 pounds of milk, testing 3.7 per cent. of fat. I want to make a point, and ask you not to condemn a cow because she is giving a small quantity of milk on a test of a short time. In every herd there are these remarkable differences in the cows, and it is this work of individual production that the Diary branch is trying to increase, and we want to bring it home to every farmer in Canada.

Thirty day test, Mountain View, Ontario, ending July 24th, 1905.

No. of Cows.	Average.			Highest Yield of Fat.			Lowest Yield of Fat.		
	Milk.	Test.	Fat.	Milk.	Test.	Fat.	Milk.	Test.	Fat.
	lbs.	p.c.	lbs.	lbs.	p.c.	lbs.	lbs.	p.c.	lbs.
30	1,012	3.6	36.6	1,250	3.7	46.2	800	3.1	24.8
15	701	3.7	26.9*	1,000	3.5	35.0*	505	3.2	16.1*
25	1,122	3.5	40.0*	1,530	3.4	52.0*	1,040	3.0	31.2*
7	850	4.1	35.3	890	5.2	46.2	620	4.4	27.2
16	739	4.0	29.5	1,060	3.6	38.1	460	4.0	18.4
10	993	3.1	31.3	1,315	3.4	44.7	740	3.1	22.9
12	930	3.5	33.3	1,120	4.0	44.8	610	3.4	20.7
5	908	3.6	33.5	1,110	3.6	39.9	720	4.1	29.5
10	796	3.8	30.6	920	4.2	38.6	570	4.0	22.8
9	1,032	3.4	35.7	1,230	3.7	45.5	810	2.9	22.6

Extreme variations are marked thus *

Thirty day test, Mountain View, Ontario, ending July 24th, 1905.

Breed.	Age.	Date Calved.	Highest.			Age.	te Calved.	Lowest.		
			Milk.	Test.	Fat.			Milk.	Test.	Fat.
			lbs	p.c.	lbs.			lbs.	p.c.	lbs.
11 Jersey.	7	May	1,230	3.7	45.5	2	April 25th	420	5.3	22.2
	2	April 25th	420	5.3	22.2	9	April 15th	1,050	3.5	36.7
Average...			868	3.9	34.2			Difference, 23.3 lbs.		
21 Ayrshire..	7	April 15th	1,315	3.4	44.7	3	April 1st..	590	4.1	24.1
	9	April 12th	680	4.6	31.2	5	April 7th..	860	3.3	28.3
	8	April 20th	1,030	4.4	45.3					
Average...			938	3.7	36.1			Difference, 21.2 lbs.		
26 Grade..	5	March....	1,060	3.6	38.1	5	Far'w	460	4.0	18.4
	4	March....	770	4.5	34.6	3	March ...	950	3.0	28.5
Average...			819	3.7	30.3			Difference, 19.7 lbs.		
30 Durham ..	10	May 27th.	1,250	3.7	46.2	2	April 10th	505	3.2	16.1
	5	April 5th.	890	5.2	46.2	7	April 5th.	1,040	3.0	28.5
Average...			970	3.6	35.4			Difference, 30.1 lbs.		
45 Holstein .	7	April 21st.	1,250	3.4	52.0	3	March....	700	3.8	26.6
	3	March....	705	4.4	31.0	7	April 10th	1,135	2.7	30.6
						2	April 20th	740	3.1	22.9
Average...			992	3.5	34.7			Difference, 29.1 lbs.		
133 Cows' averages...			934	3.6	34.0					

MR. GRISDALE: Did you make a record of the breeding of the animals?

MR. WHITLEY: Yes; I have put these figures down in another way, just to emphasize that point. The accompanying chart gives the same animals grouped according to breeds, except those of the cows that I could not get particulars with regard to.

A MEMBER: Are these pure breeds or grades?

MR. WHITLEY: There are very few pure breeds, most of them are grades. The highest yield of any Ayrshire cow was 1,315 pounds of milk. The highest test of any Ayrshire was 4.6 per cent. of fat, and the highest yield of butter fat of Ayrshire was 45.3 lbs. Contrast these figures with those which give the lowest, 590 pounds of milk and 3.3 per cent. of fat, and the same thing holds good through all the breeds, as you will notice from a comparison on the charts. The only thing that pulls the average down is a grade, and that always occurs. Quality always tells. But a difference occurs between the individuals of each breed, and that is a point we wish to bring home to you. There is a difference between the poorest Jersey and the best Jersey and between the poorest Durham and the best Durham.

The whole building of a successful dairy herd rests upon the foundation stone of an ample, economic milk supply, and it seems to me that farmers have been content with getting a fairly good yield from a whole herd of animals without paying sufficient attention and without realizing that every individual cow, every single one, must be made a profit-making animal. (Applause.) The whole measure of success in the dairy business, the whole measure of profit depends upon an intelligent answer to this searching and proper question, "*Is every cow in the herd making a profit for you?*"

Now I submit that can never be answered simply by testing the herd occasionally, but every dairy farmer who wishes to consider himself business-like and be up-to-date in his methods must test systematically the production of every individual cow, and weed out the poor ones before he can have a profitable herd. The first step in this matter is thinking about it, getting interested in it, and when you make the test, unless the cow is producing enough to pay for the cost of feeding, no amount of reasoning and no amount of sentiment can make her a profitable animal. The profit will depend upon these three things: *Yield of milk, per cent. of fat, and the cost of feeding.*

I would like to quote as an example an experiment made in Pennsylvania, where 101 dairies were tested and 58 of them show an actual loss. 1,900 cows were tested in Vermont, and 69 of the owners of those cows were actually receiving less from the factory than the cost of the feed, and I would like you to note that these were not grade or scrub animals, but half of them were of the recognized dairy breeds, Jerseys, Guernseys, and Ayrshires.

Look at this thing in another way. Take the cost of a pound of fat, or 100 pounds of milk. I have culled some figures from the work done in the State of Illinois, and taking these from good cows, the cost runs from 6½ to 13½ cents, and with poor cows the cost runs all the way from 14 to 52 cents. On an average it takes 25 cents to produce a pound of fat, which a farmer sells for 19 to 20 cents. There is no money in that. Surely no more striking proof can be given to you how easy it is to lose money with cows unless you know just what they are doing.

It seems to me that every farmer in Canada should be interested in this matter of the individual production of each cow. There should be no indifference whatever on the part of any man. It has been proved time and again, by a number of tests made in the United States and Canada, that a great many cows are kept at too small a margin of profit, and that many are kept at an actual loss; and I wish to say that I am convinced that the average production of the dairy cow in Canada can be doubled inside of a few years if the farmers would go at the work in a systematic way. It can be done with little expense to the farmer, and no one should hesitate two minutes in this matter. We will provide every farmer with a sample bottle for each cow and a spring balance, which can be purchased for $1.25 or $1.50. It is not a legal balance for trade purposes, but it can be used for household purposes. And by having things so arranged in the stables that the tests can be taken six times a month, it will only take an ordinary handy man about one minute to put the milk into the bottle, which is fitted with a screw cap, and the bottle only costs five cents. In that way you will have a record of each cow for the year, and the Minister of Agriculture for the Dominion has undertaken that where any twenty farmers will agree to weigh the milk on that proposition, three days during the month, that is six milkings, and take samples, the Department will do the testing free of cost.

I am exceedingly happy to state that we had the pleasure of forming the first Cow Testing Association in Canada last Saturday, and I will leave you to say where the second district is to be. The prime requisite is an interest in the matter. You are already interested in it, from the very fact that you are dairy farmers, and you should investigate and see that the unprofitable animals are taken out of the herd and disposed of. I think this is a most crucial question in dairy farming. It is just on this very point where profit begins, and it is a matter of the utmost moment. It seems to me to lie at the very root and foundation of successful dairying. First of all you determine the merits of each individual cow by weighing the milk and ascertaining the percentage of fat and the cost of feed, and only when these are known can you be sure whether the animal is a source of profit or loss to you, then you should cull out the poor cow and get rid of her altogether. It is stated that the farmers in Illinois, where they made this very poor test, were in the habit of sweeping off the cows to get the snow and ice from their backs before milking, and you cannot expect the cows to do good work in such quarters as that.

Now I want to turn to Denmark, that little country that has about the same population as the Province of Ontario, but Ontario is thirteen times as large. In that little country they realize the importance of agricultural education, and they have forty-four dairy schools. They have a hungry, sandy soil, and it is exposed to the German ocean on one side and the icy Baltic on the other side. The summer is short and dry, so that it is not particularly well adapted to dairying, and yet last year they had $20,000,000 worth of agricultural produce, and imported one million tons of oil cake and bran to feed to their cattle. Their wonderful agricultural progress is a result of splendid co-operation and organization. They realize there, as we should here, that individual progress is bound up with the progress of the whole people. The condition of the farmer here is exactly the same as it was there: the needs of one is the need of all, and the ambition of one should be the ambition of all. We need to apply the excellent principles of co-operation to agriculture, and the farmers should work together and improve at the same ends. Now most of us are long enough out of school to have forgotten that the agriculture of Denmark is the result of forty years' work. The Prussian war left them with a poor country, and by moving together, each for all, with regard to these tests, they have carried on the work to a marvellous degree: and now there are 9,000 farmers engaged in testing 165,000 cows every day of the year, and I assure you it will pay you to do the same thing in Ontario. One of the results has been that inside of this year they have increased the average of the milk production from 5,500 to

6,500 of milk, that is an increase of 821 pounds with 50,000 cows. That is the record of one little group of creameries. I very much question if you could get 50,000 cows in Ontario that are producing 6,500 pounds of milk in one district, and that is the record of one association in Denmark.

Let me give you one or two results of what is being done along this line in the district of Cowansville. One farmer there began taking the records of the animals in his herd, and inside of eight years he had more than doubled his average production of butter. He had increased from 125 pounds to 254 pounds per animal and he has now purchased a ten-bottle machine for his own use, and he is doing his own testing on the farm. He is not asking the Government to do it.

A man in Nova Scotia has more than doubled his average per cow and there is a record in Ontario where a man was getting $34 per cow and is now getting over $70. One of our tests was taken in Prince Edward Island, and that reminds me of an innovation they have down there; they are giving prizes for the highest production of milk per acre. Their rules are exceedingly simple. A man only requires to have 5 acres of land, and the milk must test a certain percentage of fat. The first prize was taken by a man who only worked 32 acres, and his production per acre was 672 pounds of milk.

The dairy business of this country has now reached $95,000,000 per year, and it all depends on the individual cow; and just as you improve that individual record you will improve the whole business, and the cow has rightly been termed the mother of all agriculture. There is a great surprise awaiting every farmer who tests his cows. After a farmer has taken up this work for a little time he will become so thoroughly interested in it that he will want to do it most methodically and systematically.

And what is going to be the result of this work? First of all, the intense satisfaction and increased self-respect that always follows the successful outcome of any praiseworthy endeavor, and then there will be public esteem. The man who has improved a herd of cattle is the pride of the locality. And then there will be an increase in the amount of the monthly check received from the factory. Just as a decreased quantity of milk adds to the expense of manufacturing, so a larger quantity of milk will lessen the cost of manufacturing. So that you will see at once there is going to be a great benefit to the manufacturer, and a direct benefit to the farmer; and I think it will solve the problem of the poorly equipped factory, and hasten the day when we will have no more of these unsanitary cheese factories. City merchants are interested in this matter of increased production, and it will help to keep the boys and girls on the farm. It will not be like a humdrum chore that they have to perform, but it will make a fascinating competition and a friendly rivalry, besides being a direct benefit to everyone engaged in the work. I think also that by following it out we will have a great improvement, and I believe we now see the dawn of a great prosperity for Canadian farmers. (Applause.)

The CHAIRMAN: The address we have just heard is possibly the most important address that could be delivered to this audience. Mr. Whitley has given a great deal of study and care to the subject he has on hand. We must all realize that the foundation of our business is the building up of our dairy herds, and getting twice the quantity of milk we are now getting from our dairy cows. Don't fool around trying to milk a steer and getting 25 pounds of milk from an animal that is not adapted for making milk. Find out something about what these cows are doing. Supposing we furnish twice the quantity of butter and cheese we are doing now, some people say we would overdo the business. I would like to take you to the heart of the English-speaking world, to the city of London. We all feel proud that we are British subjects, and we feel particularly proud of this great city of London. The manufacturers of Canada were entertained in the Old Country last year, and were shown that great city of London. There was one particularly bright fellow from Brockville in the crowd, and he told me a little story when he came back. He said he went in to get a cup of coffee in a fashionable restaurant, and he said to me he never saw so many well dressed people in his life before. I said to him: "Did you ever attend the Eastern Dairymen's Association in your life?" (Laughter and applause.) He said he had not. But he said that in the city of London he never saw so many well dressed people—plug hats, etc.—sliding into this restaurant, one man getting a cup of coffee, or some crackers and cheese, and another man a glass of ale and a piece of cheese, and they all seemed to be in a hurry; but he was not in a hurry, as he was looking up the business, and he sat down and watched this rush of people. A big book lay on the table that gave the consumption of all these different articles in the city of London, and he looked up and saw 10,000,000 sacks of wheat brought from this and other countries was consumed in London in one year. Then he ordered some milk and he looked up how much of that was consumed, and he found that 65,000,000 gallons of milk was used in this one city, and they are going to consume more of it. Then he thought he would like to have a little taste of Canadian butter, and he asked for some, and he found from his book of reference that there was 80,000,000 lbs. of butter used in the city of London, just for greasing the bread. (Laughter.) Then he found they used 30,000 tons of cheese and 450,000,000 dozens of eggs. Think of 10,000 miles of eggs laid along in a row! They also consume in London 360,000 tons of meat. He saw a number of them taking a glass of ale with a hunk of cheese and some crackers, and he found out that they used 1,700,000,000 gallons of beer—rivers of beer they drank in that one city. And when you look at those immense figures do you not think it ridiculous to talk of over-production? If we give these people the goods they want, a nice sweet article, you can never over produce.

Now during the present year we have taken in 10,000,000 extra good dollars for our dairy produce, and don't you think we ought to improve our herds and factories and everything, if it was only for loyalty, for we Canadians belong to the greatest colony in the British Empire, and we belong to the greatest empire the world has ever seen? (Applause.) If we did not do it for the money we ought to do it for loyalty. They tell a story that during the American war, when General Sherman made that famous march from Atlanta to the sea, where desolation was spread all along the route, that the general happened to be in the rear of one of the regiments, and he saw one of the soldiers straggling along behind. The poor fellow seemed to be discouraged. The toes were out of his boots, and he was talking to himself, and trying his best to keep up, but he could not. His gun was dragging on the ground, and he was saying to himself, "Yes, I love my country," and then he would make another effort to get to the front; "yes, I love my country, and I'm ready to die for her; but after this here war is over, I'll be darned if I ever love another country." (Laughter.) Now we do not want to follow that way; we want to love this country, and we want to make that record better, and we can only do so by standing up and furnishing these goods that the people in the country want, and we can do a better business if we try.

FEEDING DAIRY COWS.

By J. H. Grisdale, Agriculturist, Central Experimental Farm, Ottawa.

I suppose we are entitled to think we are amongst the best Associations in the world. But I would like to say that we have lots of work yet to do. The first speaker this morning said that the average production from our cows was 2,500 lbs. per annum, and that does not look like doing the very best work we can. We have dairy cows that give 10,000 lbs. of milk annually, or just four times as much, and therefore you can see that there is a wonderful possibility in the future for this Dairy Association of ours. I do not think we have done quite enough in this Association towards the improvement of our dairy herds. True, we have done something, devoting a great deal of our time to really necessary work, the improvement of our factories and market conditions. But if we are going to make this business a success in the future we have got to dig right down to bed rock and get after the farmer—not the farmers who are here, because I am sorry to say we are able to get only the best farmers to these meetings; but how are we going to get at the average farmer? It seems to me that if we are going to make a success of it in this Association we have got to do something a little more searching and more reaching into the centres of population. We must get right after the farmers. I think this work which Mr. Whitely has outlined is one which might well receive the attention of this Association. We might consider the appointment of a committee who would give this thing their particular attention throughout the present year, and try to interest every maker and secretary of a Farmer's Association in the improvement of our dairy herds. I think we might devote, particularly, all our attention one day of this Association to the building up of our dairy herds, and to consider means for improving them.

I am not an active member of your Association, but I do hope something may be done along this line. I am conscious of what can be done, because for the last seven years I have been working along this line myself, and the results I have succeeded in getting farmers to secure are really astonishing. Mr. Whitely gave you two or three examples. I can give you dozens more of the improvements that have been achieved by individual farmers; and if we can get our farmers into little clubs everywhere throughout the Province in connection with every cheese factory and every butter factory I think we would do more to help along this dairy industry in Eastern Canada than in any other way I know of.

What I want to draw to your attention to-day are three lines along which we might work. There are three ways of improving every dairy herd. First, by feeding the cattle as well as we can; second, by improvement in breeding; thirdly, by selection.

Mr. Whitely this morning said there was no use to feed unless you had the breed, and I think our honored President made the same remark; but, there is a whole lot of room for better feeding, even with the cattle we have. We cannot get to work and change our herds at once. We have to work with what we have, and you would be more than astonished at the improvement you could make by better feeding methods if you gave your cattle all they could eat, and paid particular attention to the kind of feed you gave them. Do not try to give them lots of straw and think that will satisfy, but give them a sufficiency of good food. To prove to you that a sufficiency of food is not generally given, and that a sufficiency of food is a profitable thing to give, let me give you an illustration of what was done in the State of New York. A professor of dairying over there, some four or five years ago, decided that he would investigate the dairy work that was being done by some of the farmers in the immediate neighborhood of the Agricultural College. He inspected a large number of farms, and at last settled upon one where there was thirty odd head of cattle. He took notes of the work that was being done, and after a few days interviewed the farmer, and asked him if he would have any objection to allowing a man to come in there and weigh the milk from each cow, and take samples, and if he would be willing at the end of the year to sell his herd. The farmer agreed, and for one year an exact record of the feed given these cattle and the milk produced was kept. At the end of the year it was found the cattle had consumed $28.50 worth of feed, and produced $25 worth of milk. That is, the farmer had lost $3.50 on each cow in his herd, a matter of something like $100. That was a losing proposition, and I venture to say that on an average the dairy cattle in Ontario to-day are not one whit better. We are not getting the full market price for all the feed we are giving our cattle. True, we get good prices for the feed and a large amount of manure, but it does not more than pay for the work, as we have found out over and over again in our experiments at Ottawa. This state of affairs is not right, when a good dairy cow will produce as much as 10,000 lbs. per year. That herd in New York was bought, and the next year it was fed under the direct control of the Experimental Station in that State. and the cattle given all the food they would eat. I regret one feature of this experiment, and that is, that the food given was not such as we generally give to our dairy cattle. It was food that was very rich in fat, that they fed the cattle all they could eat, and at the end of the year found the cows had eaten something like $28 worth of food and had produced $38 worth of milk. That is, for the extra three or four dollars worth of feed the cows had increased their milk production by something like $13. Now, it is the last little bit of food that makes the increase. The farmer who had been giving these cows just what he thought was sufficient to keep them going had been feeding them at a loss, and in the Station where they gave them what food they could consume, regardless of economy, they feed them at a profit. These cows were just a mixture of all sorts and conditions, just such animals as you would find on an ordinary farm. That shows that if we give our cattle sufficient food the average cow will give a profit. Sometimes we neglect the cows in the summer. When they are in full flow of milk there comes a dry spell, and the first thing we know the cows that were giving one thousand pounds a month are down to five and six hundred pounds, and what do you do? Generally speaking, the farmers of this country say, "We will have rain pretty soon, and will have more milk then," instead of having things ready to give them a whole lot of food they let them do without. We ought to be prepared for all such emergencies and be ready to give our cattle any amount of green food in the summer, and in that way we could keep up the flow away into the fall months, and have them giving a thousand pounds of milk in September and October.. Then in the winter time we neglect our cows by giving them, as a rule, too much dry feed. All our experiments go to show that if we are going to succeed in securing lots of milk in winter, economically, we must feed succulent food. In an experiment conducted at Ottawa last year, we have proven over and over again that a succulent ration is the proper ration. In the case of a dozen cows fed a ration of dry feed, clover hay and meal, they kept falling off at the rate of about ten per cent. per month, and in some cases as high as fifteen per cent. The average cow that has advanced more than a month from the lactation period decreases at the rate of about ten per cent. per month if the ration is not such as will keep up the flow, to prevent a decrease a suitable ration must be supplied. In nearly every case where we feed a dry ration the decrease was at a greater rate than ten per cent.; in some odd cases it went as high as twenty per cent. where only dry food was given. We had another dozen cows on the other side that were receiving a succulent ration, roots, ensilage and a little bit of straw and the same quantity of meal and a little bit of hay, and these cows only decreased at the rate of eight or nine per cent., and where we varied the succulent ration and gave sugar beets in place of mangels we sometimes got them to hold their own. Where turnips alone were fed we had practically no decrease. Where mangels alone were fed not quite as good, and where mangels and ensilage were fed they did a little better. So that you see if you have any particular preference for any one of these kinds of succulent foods, you may anticipate good results from any one of them. Probably sugar beets and sugar mangels will give the best results, but any one of them will give good results.

As to the economy of these different rations. If we value our ensilage and roots at $2 per ton, and our clover hay at $7 per ton, we find that the ration of clover hay is more expensive than the succulent ration. Therefore, you can see there are two reasons why we should feed a succulent ration in winter and a succulent ration right through the spring season until the grass is in full flow.

I think that is one point which we ought to try and emphasize and drive home to the farmers, and one that we cannot say too much about, and that is to have succulent food for the cattle all the year round. We have experimented in the use on different soiling of the crops and none of these have proven quite so economical or quite so handy as silage. You cannot keep roots all the year round; therefore, you have to have some other succulent feed, and in summer we have found silage is probably as economical a class of food as any you can grow. It will grow in large quantities, and is in better shape for feeding. There are very many reasons why the up-to-date farmer should have a summer silo in addition to his winter silo.

The question of the number of times a day we should feed is one of considerable importance. I remember having a tilt with our honorable President some few years ago at a meeting of this Association upon this question of feeding dairy cattle, and I was inclined to think then it was necessary to feed three times a day in order to get the best results. Since then we have been experimenting each year, more or less, upon this line, and without going into the results of our experiments, I may just say that we only feed twice a day now. Early in the morning a succulent ration of roots, silage, straw and meal mixed with it. Immediately after feeding this ration we give them a portion of hay, say about three pounds of clover hay per cow. They are through eating about half-past eight or nine, if you feed them about half-past five, as we do. From that time on till half-past three they are not bothered, but are allowed to lie still the livelong day, unless we have a lot of visitors, when they have to get up. We like to see them lie right through till half-past three when they receive the same ration over again. They are allowed about an hour or an hour and a half to eat the roughage, during which time the men are milking, and then they are given the feed and long hay. As to whether hay should be fed long or short is a matter of taste, to a certain extent; but we find that if a certain portion of the hay is fed long it has a beneficial effect on the digestive organs of the animal, and there is very little danger from scouring or bloat, and the cattle are less likely to go off their feed. We find that about as profitable a proportion of meal as we can give is about one pound for about five pounds of milk produced. The cow producing forty pounds of milk per day should get about eight pounds of meal.

Another thing in connection with the feeding of cows is that we find it pays us to study the likes and the dislikes of each cow just as it pays a good boarding-house keeper to study the likes and dislikes of his boarders if he wants to keep them. We find our cows are just as fickle in their tastes as any class of boarders, and we can do a great deal to increase the milk flow by studying their different tastes.

In the year 1899 we kept an exact record of the milk from our cows, and gave them a uniform meal ration of about eight pounds a day of mixed oats, bran, shorts, and a little bit of oil meal. The oats, bran, and shorts were about equal parts and the oil meal about one-tenth of the others. With this ration we were able to produce from an average herd of grade cows about 6,100 lbs. of milk per cow. Next year we changed this and watched every cow and studied her likes and dislikes, and the second year we were able to bring up the average of that herd by 1,100 and some odd pounds, just by studying the likes and dislikes. To feed each of these cows during 1899 cost us $35, and during 1900 it cost us only $33; that is, we saved $2 by catering to the tastes of the individual cows, by watching very carefully the possibility of each cow and by getting the very best out of each cow that there was in her, and it is impossible to do this without keeping a record of the individual animals.

Here is another point where this keeping of records comes in and proves invaluable to the man who is taking an interest in the development of his dairy herd. He cannot get the best out of them unless he knows what every cow is doing all the time.

A Member: How do you water them?

Mr. Grisdale: We have water before them all the time. We never think of watering the cows; it is always there, they drink whenever they like, and that is the way I would like every farmer to do. I have a stable of my own, and I am not very rich, but the first thing I did was to put water in, and I think any farmer can put water in his stable for about $60. I had to bring it about five hundred feet, and raise it about twenty-five feet, and the whole thing cost me only $60, work included.

A Member: It cost me six times that.

Mr. Grisdale: You probably put in a more elaborate plan. I have a pump in the stable and I have to pump it by hand. We pump it right into the troughs, and we have a long trough in front of the cattle. That is not, probably, the best plan. Some people advocate having individual boxes, others have boxes for every two of the cattle and others have one trough for the whole string. I have two troughs, one on each side of the stable and I find it just as convenient as any other way. At the Experimental Farm we have a bucket for each animal, but I do not see any particular advantage.

A Member: Iron or wood?

Mr Grisdale: Iron. The troughs at my own farm are wood.

A Member: Does it make any difference whether you let the cattle have soft water or hard water?

Mr. Grisdale: I do not think it does make any difference. That seems to be largely a matter of taste in the animals. Once they get accustomed to hard or soft water they like the water they are accustomed to better than the other. If it is for growing animals, I think probably hard water is better than soft.

A Member: My cattle drink at the lake any time they want to.

Mr. Grisdale: That is hard water.

A Member: My cattle drink well water.

Mr. Grisdale: I do not think the water makes any difference unless you put it in the milk pail.

The Chairman: As long as the water is pure.

A Member: How do you keep your trough from getting mussed up with dirt.

Mr. Grisdale: We have them pretty high, and the cow has to raise her head to get a drink and I think that is the best plan. I have tried covers on the boxes that would go up and fall as soon as the cow took her nose out and I found they were a nuisance. They were always wet and dirty looking, and I find when the trough is high very little gets in it; but it won't do any harm to wash them out every second or third day. One of the greatest troubles we have with individual drinking vats is that they are eternally getting full or dirt and have to be cleaned out.

A Member: If you put a basin between the two cows there is not so much danger.

Mr. Grisdale: No. Still if a cow is eating ensilage or chaff she is apt to come up with her mouth full of chaff or ensilage and leave a portion of it in the vessel, and if you have it high she is not so apt to do that because she has time to get rid of a portion of the loose stuff.

A Member: How often do you salt them?

Mr. Grisdale: We have salt before our cattle all the time. If I did not have that I would insist upon their being salted once a week, at least, and I should prefer twice a week. A good plan is to give them a little bit in the food; but an objection to that is that some cattle do not take nearly as much salt as others, and if you mix it with the food each cow has to eat the same amount. We have the water trough on one side of the cow and the salt on the other. It is a little wasteful, because we find that if we keep the salt nice and clean we have to change it every week, and they use about twice as much in that way as they should; but salt is very cheap, and it does not make a difference of more than four or five cents a year, and it is much more pleasant for the animal.

A Member: Which do you use the rock salt or the common salt?

Mr. Grisdale: I prefer common salt. Rock salt is nice to have out in the field, if you have a place where the rain won't get at it. There is practically no difference in the composition of the two. In the stables if you have a manger you can put a little bit of rock salt in the corner, but there is danger of more or less moisture gathering around the salt, and it never looks clean.

A Member: Do you change the quality of the milk by changing the feed?

Mr. Grisdale: Certainly not, permanently. That experiment which I described to you as having been conducted across the line was for that very purpose. They tried to feed foods rich in fat in order to increase the percentage of fat in the milk, and during the year while the cattle were kept by the farmer they kept track of the exact percentage of fat in the milk right through. Then they gave them rich food the next year such as corn, oil meal, etc., and found that in some cases they did increase the fat temporarily, but on the average it made no difference. Many other experiments conducted in Canada and the United States go to prove the same thing. You have to depend on the breed and the individuality of the animal for the quality of the milk you produce. If you give them all they will eat of what they like you will get profitable returns from the average cow. Our average cow's returns do not show any profit, and what we want to do is to waken up and make the average cow profitable, and then waken up still further and put away the average cow and keep only the good ones. In other words we must have a better average cow.

A MEMBER: What is an average profitable cow?

Mr. GRISDALE: I would like to see her giving 6,000 lbs. of milk. The average profitable cow ought to make you $50 a year in returns. If she gives 6,000 lbs. of milk a year you will have $50 or a little better every year, and that will give you a profit of from $10 to $20 clear. You can feed a cow at $30 a year, and you can give her $40 worth of food a year, and you will not necessarily receive more from the cow getting $40 worth of food a year than you will from the cow getting $30 worth of food a year. You can lose more by feeding than you can by not feeding, if you feed them extravagant foods.

A MEMBER: Is there anything cheaper than grass to produce milk?

Mr. GRISDALE: No, I do not think there is. If we could keep our cows on grass through the year we would be delighted, but we cannot.

A MEMBER: Which breed of cattle do you prefer for dairy cows?

Mr. GRISDALE: I have experimented with five different breeds of cattle —Jersey, Guernsey, Canadian, Holstein and Shorthorns—and every one of them have produced individuals exceptionally good. I have individuals in each herd that have produced over $100 worth of butter in a year. Calculating the butter at twenty cents a pound, and the skim milk at fifteen cents a hundred, some of them went as high as $105 or $106. When you get over $100 I say they are pretty near equally good. I have found that kind of cow in every one of these particular breeds; therefore, I say if you have Holsteins, stay with them, and if you have Guernseys, stay with them, and so on. You can make lots of money with any one of the breeds. I have not had a cow of the Shorthorn breed yet that has made $100 in milk, but some of them have given near it. I had one cow that made me somewhere over $90. In all these breeds our herds average something over $60.

A MEMBER: What do you call Canadians? Is that the Quebec breed?

A. Yes; a little black cow. It is a capital little butter cow.

A MEMBER: Something like a Kerry cow?

Mr. GRISDALE: Yes.

A MEMBER: Have you any experience with the Ayrshire?

Mr. GRISDALE: Yes; they are a good breed.

A MEMBER: At the same time you admit the fact that some breeds are more sure to be profitable milkers than others?

Mr. GRISDALE: No; you have to weed out of every breed, and you have to weed a good many out of every breed. We can improve our dairy herds by feeding and by breeding. The average farmer is apt to think that as soon as he knows an animal is pure bred that it is a great dairy cow. I am not fighting against pure-breds, but let me urge upon the average farmer to keep grades, and I will tell you why. The moment you get a pure-bred, because it has a pedigree it pretty near doubles in your estimation. Supposing you had a grade that did not give much milk, and a pure-bred that did not give much milk, wouldn't you say the one with the pedigree was worth twice as much as the other?

A MEMBER: No.

Mr. GRISDALE: I tell you my experience is that nearly every time you find the man with a pure-bred he thinks it is worth twice as much as the grade; and just as soon as we arrive at that conclusion we are not going to make progress in improving our dairy herds. If we have pure-breds of the most wonderful pedigree in the world, it will not do unless we have milk production along with the pedigree. I know lots of breeders who are sending out pure-bred sires all through this country, and they are selling them all the way from $25 up, and some go as low as $5, and from that up to $500, and all you can say for many of them is that they have a pedigree. The breeders themselves are trying to get out of that rut, and they are trying to introduce into their Association inside associations, which are called Advanced Registry Associations, and in these Advanced Registry Associations each animal must have a record that has been kept for a year, or a month, and that record is recorded in this Advanced Registry. Then when that animal is offered for sale, they can say "Here is a calf for sale from Genesth 15th, which cow has a record of 10,000 lbs. of milk in the year, or 600 lbs. of milk in a week; and when we get that kind of a thing to refer to then we can hope to improve our herds. As long as you are satisfied to take the word of any breeder who says "Here is a pure bred calf with a pedigree," and if you think you are going to improve your herd in that way you will not make very much progress. There have been enough pure-bred bulls put out through this country to increase the record of our cows, and it has not done so, because, as a matter of fact, we have been using scrub sires with pedigrees, and I tell you their name is legion. Unless we are willing to get to work and weed out pedigreed animals without a record, and keep only those that come from a good ancestry on both sides, we are not going to make the progress we should; and breeders will find out that it will be a tremendous advantage to them to keep records of their cows. These records are authenticated in some cases by reliable men, and in other cases the breeders themselves take the records. I prefer the authenticated record, and when the breeder has such a record it is a wonderful help towards the sale of his stock. I received a little pamphlet the other day, published by one of the best breeders of Ayrshires in the Province, in which he gives some pictures of his cows, the records of what they produced in milk and butter fat, the percentage of butter fat in the milk, and the number of pounds of butter produced in the year. One year is a good record, two years is very much better, and three years is what we ought to have.

A MEMBER: Is not it a fact that some of the Dairy Breeders' Associations have devoted a certain amount of money towards this Advanced Registry for twelve months, and have asked the Minister of Agriculture to assist them in that matter? They are leading in this matter and not being driven.

MR. GRISDALE: That is right. I am glad you have the information. I know that is being done in the case of one or more of the Breeders' Associations. I do not know that any of them in Canada have introduced the year test, but I know that one of the Associations is working for that. It is the record that counts. We have a herd that has a record for one month, but if they had taken the record for a month further on these cows would not have made such a good showing, and I think we should have a year's record in every case if possible. I have seen some cows make a very high record for one month, and then fall off. That kind of a cow is not the proper kind to keep, and it does not pay to condemn a cow because she does not make a remarkable record in one month. I had one cow that in the first month gave nearly 2,000 lbs., and in the ninth month did not give any, and in the eighth month did not give very much.

Mr. Whitely spoke on the subject of records this morning, and I feel that I have a right to say a few words, as I started that record taking in Canada seven or eight years ago. We have printed forms which we supply to whoever cares to ask for them, and we supply enough to last a year; and I might say that we have requests almost every day for these forms and the people who use them invariably say that they have good results. The farmer who keeps a record, knows at once every little thing that happens in the barn, and he becomes wise as to the things which affect the quality and quantity of his milk yield. We cannot know too much about our business, and I am confident that it will save at least 1,000 lbs. of milk a year on the average cow to keep a record, and the time it takes does not amount to very much—not more than two hours a year—and that is only a bagatelle. It is sure to make 1,000 lbs. more per cow, and supposing it only makes half of that? I know of one man who started in five or six years ago to keep a record of his cows, and his herd then only returned him $54 per cow in the year. Four years afterwards his herd returned over $70 per cow, and he has not introduced pure-breds into his herd at all. Then it gives you a greater interest in your business, and you try to get the best out of each cow. We find that the men who are milking the cows take a greater interest, and try to do their very best to make the cows do the very best, by feeding and tending to them in the best possible way.

A Member: What is the best cross?

Mr. Grisdale: Supposing you have a common herd to-day, get a pure-bred bull.

The Chairman: Get a sire from a good milking family, and weed out the poor cows. Nobody can suit you except yourself: everybody has got to be satisfied. Now, about that salt matter? I do not agree with Mr. Grisdale in that regard. Why not give a Canadian salt, the best salt made in the world. Give them fine salt that they do not have to spend half an hour licking up. Make a little fuss over these cows, and make them believe they amount to something in the country, and then a cow will work for you.

FEEDING THE DAIRY COW.

By Henry Glendinning, Manilla.

You have listened with a great deal of interest to Mr. Grisdale, and asked a number of questions showing that you take great interest in the subject that is being discussed. Mr. Grisdale has touched some of the points on feeding, but he has left a great deal for me to say, but before touching on that subject I wish to draw your attention to a few points of the dairy cow. Mr. Grisdale has told you that the best way to select a dairy cow is by keeping a record of the milk she gives, and by testing that milk to see just how much butter-fat she will give you in the twelve months. Now I believe that is the very best way to test a dairy cow.

If you were to go out through this part of the country to buy cows to-morrow I fancy you would find very few farmers who had good cows for sale, who had kept a record. The cows that you would be able to buy would be the ones farmers wished to cull out, and you would not find a great many records.

After all, we have to depend largely upon our judgment in buying a dairy cow, and there are a few points that is is well to look to. It is not always possible to tell just exactly whether a cow is going to be a first-class cow or not, but we can tell pretty near. If you wanted to select a dozen cows for milking purposes and a dozen for beef purposes, you would select them differently.

Now I want to call attention to the points we look for in a dairy cow. I have a drawing of a cow here. When you go to purchase a dairy cow you should look at her at a distance say 25 or 30 feet and take in her general conformation. We want that cow to have a feminine look, nothing of the steery character about her. If her head was sticking out through a door you should be able to tell at once that she was a cow. The first view you should take is right in front of the cow. Look at her head and breast. She should be large and broad across the breast. Do not pay so much attention as to the difference between the legs as between the points of the shoulder blades; we want them wide in the particular place.

Mr. Grisdale: Does not Mr. Hoard say he does not care whether they are wide there or not.

Mr. Glendinning: I think he does. We want a good broad strong mouth, one that will be able to take a great deal of grass in a short time, upon the same principle that a mower that is six feet wide will cut more grass in a given time than one that is only 4¼ feet.

She should have large nostrils so that she will be able to take in a large supply of fresh air; a large nostril generally goes with a good lung cavity. Then the face should be clean cut and wide between the eyes, and the eyes should stand well out, giving a dished appearance to the forehead. If you find that, you are pretty sure that you have a cow with a large brain; and you require a large brain, because the brain is the seat of the nervous system, and it is through the nervous force that the milk is liberated from the blood.

We want good width between the horns, and the horns should not be too close. We also want a good space between the jaws. The reason for that is that the glands that form the saliva are there, and if they are strong the cow is in a position to secrete and give off a very large amount of saliva when shewing her food, and this helps digestion. A good cow should be clean along the neck and thin, without anything in the form of a crest, the neck running back into the shoulder and sharp at the shoulder withers, and running up to a sharp edge, and then extending wide in the shoulder blade, so as to give a large amount of room in the chest cavity. Running along the backbone she should be strong, and the backbone standing up lean looking. In a beef animal we want that well covered in, but in the case of the dairy cow we want it just the reverse, the backbone should be strong, because the spinal cord is the means by which the nervous force is carried from the brain through the whole system of the cow. Branches are sent off from that spinal cord and each section of the vertebræ. The ribs should be well spread out, and coming down, showing a large barrel, so that the cow is able to take in large quantity of rough food. Running back to the hip bones we want them long, and a good space between the ribs and wide between the hocks, and a good length from the hocks to the point of the tail. Coming to the hind quarters, a cow should show wide between the hock bones giving her the appearance of a wedge running towards the front. Then standing behind and looking down inside to the legs, they should be incurving with plenty of room for a large udder, and then they should be cut away taking the tail as plumb as a line, giving what we call a cat-ham, that is a very light quarter: just the reverse of what we would require in a beef animal. An animal of that kind would not give much round steak.

We want the udder to come well up behind and running well down a good width, and well forward. When the cow is giving milk the udder should be full and plump, and when she is milked out, the skin should hang in loose folds so that she does not show very much in the way of a large udder when she is milked out. Sometimes we run across cows that have fleshy udders; it is a difficult thing to tell whether they have been milked or not, and that is not a very desirable cow. On the udder there should be four nice teats, so that they will just fill the hands and nothing more, neither too small nor too large. The skin of the udder should be soft and pliable, covered with a fine silky hair, with no indication of coarse hair; and I like to see the udder covered with veins so that when you stand and look at the cow these veins stand out quite prominently. Coming forward from the udder is what we call the milk veins that enter the body. They should be large as possible, and the more crooked and twisted up the better. They are called "milk veins," but they do not contain milk. They simply contain blood.

There is no necessity for a heavy bone in a dairy cow, all that is required is just enough bone to carry the animal around. The whole animal should be covered with a nice soft pliable skin, one that you could take hold of and pick up nice and readily. It should be free from any hardness, and it should be free from what we call paper skin. If you find a very thin paper skin, you generally find that the animal has a weak constitution, and not very active in her digestion. There should be an oily touch to the skin, and it should be covered with a soft, silky hair. In the case of a beef animal we look for a long soft mossy hair, but in the case of a dairy cow we want a short, soft silky hair. In the ears, and about the root of the tail and under the skin, should be of a yellow color; that is generally an indication of what the color of the milk may be. Many people think this an indication of rich milk, but I do not think that is the case.

A MEMBER: What about her tail?

MR. GLENDINNING: We want a fine tail. We do not want a heavy coarse tail, and one that extends down below the hock, and you will find that in nearly all the dairy breeds.

Grass of the right kind is the best and cheapest food we can give to the dairy cow, and we should try and get as near that condition as we can in the winter time. In the summer she is out on the grass in the sunshine and breathes the fresh air, and she gets a moderate amount of exercise, and she cleans herself by pawing the soil over her back, and she is washed off by the warm showers of rain.

One of the first things to consider is the stable. Let us have warm comfortable stables with plenty of light and sunshine; have the cow thoroughly cleaned by brushing, because they have not an opportunity to clean themselves. Give the cows succulent food, and if we do that we are going to get the very best results in the winter time; not as good as we get in the summer time, but we will get very near to it. Now, what are we going to do to supply that food in the winter time? There are a number of feeds that we might feed such as silage and roots of different kinds. It is largely a question of which we can produce the cheapest. I think it has been conceded, however, that so far as silage feed is concerned we can provide corn silage cheaper than any other. Corn silage fed alone is not the kind of food that will give the best results, unless you feed something else with it.

A MEMBER: Will different qualities of feed produce different qualities of milk?

MR. GLENDINNING: Yes, if you feed turnips you will get a turnipy flavor.

A MEMBER: By feeding clover hay or a high quality of food can you produce a larger quantity of butter fat?

MR. GLENDINNING: No, you cannot. You may for a while, but she will come back to her normal condition. I think the quality of the milk is a characteristic of the cow or her individuality. Of course you will get more pounds of butter fat by increasing the quantity of the milk.

A MEMBER: You can produce the same amount of butter fat from a good butter producing food as you can from any other kind of food. Supposing in the winter time you feed barley chop and timothy hay, can you get the same product from the cow as if you fed clover hay and oil cake?

MR. GLENDINNING: You certainly cannot. In the first place the cow that is fed on timothy hay and barley will not give you as large a flow of milk.

A MEMBER: Would she give a better fat test?

MR. GLENDINNING: She will give you a better fat test just about the same as if fed on clover hay and pea meal, and you can throw in the oil cake, too.

Below is a chart showing 100 pounds of food and the digestible percentage in comparison with 100 pounds of grass. For the production of milk we find that clover and ordinary Kentucky Blue grass is little over 34 pounds of dry matter, the rest being water.

Digestible Nutrients of Feed Stuffs per 100 pounds Concentrates.

——	Dry matter.	Ash.	Protein.	Carbo-hydrates	Fat.	Nutritive ratio.
Wheat	89.5	1.8	10.2	69.2	1.7	1:7.1
Barley	89.1	2.4	8.7	65.6	1.6	1:7.9
Rye	88.4	1.9	9.9	67.6	1.1	1:7.0
Corn	89.1	1.5	7.9	66.7	4.3	1:9.8
Peas	89.5	2.6	16.8	51.8	0.7	1:3.1
Oats	89.0	3.0	9.2	47.3	4.2	1:6.2
Buckwheat	87.4	2.0	7.7	49.2	1.8	1:6.7
Field Beans	85.5	3.1	23.0	50.2	1.4	1:2.3
Flax Seed	90.8	4.3	20.6	17.1	29.0	1:4.2
Sunflower	92.5	2.6	12.1	20.8	29.0	1:7.4
Wheat Bran	88.1	5.8	12.2	39.2	2.7	1:3.7
Wheat Shorts	82.2	4.6	12.2	50.0	3.8	1:4.8
Linseed Meal, O.P.	90.8	5.7	29.3	32.7	7.0	1:1.6
Cottonseed Meal	91.8	3.5	37.2	16.9	12.2	1:1.2
Grasses—Green.						
Kentucky Blue Grass	34.9	2.8	3.0	19.8	.8	1:7.2
Orchard	27.0	2.0	1.5	11.4	.5	1:8.0
Red Top	34.7	2.3	2.1	21.2	.6	1:10.0
Timothy	38.4	2.1	1.2	19.1	.6	1:17.1
Clovers—Green.						
Red Clover	29.2	2.1	2.9	14.8	1.7	1:5.6
Alsike Clover	25.2	2.0	2.7	13.1	.6	1:5.3
Lucerne Clover	28.2	2.7	3.9	12.7	.5	1:3.5
Hay.						
Red Clover	84.7	6.6	6.8	35.8	1.7	1:5.8
Timothy	86.8	4.5	2.8	43.4	1.4	1:16.7
Straw.						
Oat	90.8	5.1	1.2	38.6	1.8	1:33.1
Peas	84.0	4.5	2.9	33.4	1.5	1:12.0
Silage.						
Corn	20.9	1.4	.9	11.3	.7	1:14.4
Roots.						
Sugar beets, feeding	13.5	.9	1.1	10.2	.1	1:9.4
Mangels	9.1	1.1	1.1	5.4	.1	1:5.1
Turnips, Swedes	11.4	1.2	1.0	8.1	.2	1:8.5
Carrots	11.4	1.0	.8	7.8	.2	1:10 3
Parsnips	11.7	.7	1.6	11.2	.2	1:7.3
Potatoes	21.1	1.0	.9	16.3	.1	1:18.3
Rape	14.0	2.0	1.5	8.1	.2	1:5.7
Field pumpkins	19.1	.5	1.0	5.8	.3	1:6.5
Milk and its by products.						
Milk, new	12.8	.7	3.6	4.9	3.7	1:3.8
Milk, separator	9.4	.7	2.9	5.2	.3	1:2.0
Buttermilk	9.9	.7	3.9	4.0	1.1	1:1.7
Whey	6.6	.4	.8	4.7	.3	1:6.8

The first column represents the dry matter that the food contains, the balance being water. All food stuffs contain water. The amount varies from eight to fifteen pounds per 100 pounds in such dry materials as hay, straw and grain, and from 60 to 90 pounds in green grasses and roots. The animal makes use of the water to form a portion of the organs and fluids of the body, to aid in dissolving solid food and to carry it by means of the blood to the various parts of the body.

Definitions. Ash is what is left when the combustible part of feed stuff is burned away. It consists chiefly of lime, magnesia, potash, soda, iron, chlorine and carbonic, sulphuric and phosphoric acids, and is used largely in making bones and in furnishing certain constituents of the digestive fluids.

Protein (or nitrogenous materials) is the name of a collection of compounds containing nitrogen. Protein furnishes the material for the lean flesh, blood, skin, muscles, tendons, nerves, hair, horns, wool, the casein of milk and the white of eggs, and is one of the most important constituents of feeding stuffs.

Digestible Carbohydrates (nitrogen-free extract) includes starch, sugar and gums, and forms the largest part of all feeding stuffs, but especially of the grains. They are either manufactured by the animal into fat or burned in the body to produce heat and energy.

Fat (ether extract) is an impure product and includes besides real fat or oils, such as linseed or cotton seed oils, wax and the green coloring matter of plants. The fat of food is either stored up by the animal as fat or burned as fuel to furnish heat and energy. The heat or energy which a pound of fat will supply through combustion is equal to what would come from the burning of 2¼ pounds to 2½ pounds of sugar or starch.

The Nutritive Ratio is the relation that the protein bears to the digestable carbohydrates and fats combined. When feeding a full ration to animals (say for the production of milk) under summer conditions of temperature and not too much exercise being given, requires about 1 part of protein to 5½ parts of the carbohydrates. But here the good judgment of the feeder is required. If the stables are cold, or only a maintenance ration being fed, the carbohydrates must be increased. It has been ascertained by experiments that at times it requires as much as 11 parts of the carbohydrates to 1 of protein. This will show the folly of feeding in cold quarters, or only enough feed to maintain the animal without making bodily gain or producing milk. The feed has been wasted or burned up in the body of the animal without any profit to the feeder, the same as wood or coal would be in an engine boiler to keep the water warm without producing steam.

It has been ascertained that if you are feeding animals under summer conditions of temperature while they take in all they can consume, it requires about one part of protein to 5½ of carbohydrates. But we do not always have these conditions in the winter time, because our stables have not a summer temperature: and therefore we have to add a little more heat forming. That is, generally speaking, the conditions in this country we require, about one part of protein to six of carbohydrates. I think, as I said before that foods that give to us the best results are those which contain a large amount of protein. Kentucky Blue grass is one of the best, and white clover is one of the best foods we have for our cows.

A Member: Will she give as much milk unless she is fed on a well balanced ration?

Mr. Gendinning: No, she will not; because if you want to get a large flow of milk you must feed the food that contains a large amount of protein along with a succulent food. Corn silage is one of the best foods we have in the winter time, but if you want to get the best results from corn silage you must feed something else with it—clover hay or Lucerne hay. The best results I ever got was from corn silage and Lucerne hay, and in addition we fed bran, pea meal, and ground oats.

The PRESIDENT: There are a few people here who have got it into their heads that you can feed fat into a cow. Now we want to say that is not true. There is not a word of truth in it, and we do not want you to talk about it any more. (Applause.) I will tell you what to do: Feed your cow a large quantity, keep her in a good warm stable, and have her provided for in the best possible way, and she will give you twice the quantity of milk she would if not properly cared for.

A MEMBER: A great many people in this locality think that you can make a Holstein cow give Jersey milk.

Mr. GLENDINNING: No, you cannot do it.

A MEMBER: Can you increase the quantity of the milk by the food?

Mr. GLENDINNING: Sometimes we think that Holsteins do not give as good milk as a Jersey, but sometimes we find a Holstein that gives very rich milk.

Mr. BARR: This gentleman has asked two or three times can you improve the milk? That does not always mean butter fat? You said if he fed turnips he would get a turnipy milk, and if he feeds timothy he will not get a timothy milk. Is not there a possibility of improving the milk, as to flavor, by the feed you give?

Mr. GLENDINNING: That is a question I am not supposed to talk about very much. I think the cheese instructors and Prof. Dean and Mr. Publow ought to take that matter up to-morrow.

Mr. AYERS: I would like to know how we are going to feed turnips with the least possible damage to the milk. It is a question that there is a great deal of controversy about. A number say if you feed the cow just after you milk her the turnips will not flavor the milk; but I do not believe that, and I do not know how to feed turnips to a cow so that they will not flavor the milk, unless you boil the turnips, and I do not think there is anybody willing to boil turnips in order to carry off the flavor. I know a great many people say they can feed turnips so that they won't flavor the milk, but I say I cannot.

The CHAIRMAN: Nor anybody else on earth. If you want to grow roots to feed your cow that won't flavor the milk, grow mangels, and you can grow just as many pounds and, possibly, a few more, than you can turnips, and there will not be any flavor from them unless they become rotten and decayed.

Mr. GLENDINNING: The subject of water, I think, is important. As I drive through the country I see so many cows making a bee-line across the field towards the creek in the winter time. A hole is cut in the ice, and the big cows drink first, and, after they have drunk their fill, they stand around the hole and keep the weak ones from getting a drink. After a while they start off, and then the weak ones have become so chilled that they start back to the barn without taking a drink of water at all. Then they are kept out in the barn yard, because the farmer thinks his cows require "exercise," and that it is an advantage for the cows to come back to the barn yard and stand on their toes for a while to keep up circulation. How cold do you think the water is that the cows drink from under the ice? If you try it with a thermometer you will find that it stands at just near 32 degrees, only a fraction of a degree from the freezing point. The cow that is very dry will drink a large quantity of that water, and the first thing she does, is to warm up that water, with the expensive food you have been feeding her, to the temperature of her body, which is 102°. The temperature of a cow's body is warmer than that of a horse's or a man's, and, therefore, that water has to be raised 70 degrees, and that takes a great deal of fuel in the form of grain, hay and other food. The cow that is doing that is not making any milk. She is allowed to stand out till she becomes chilled, and then put in the stable to warm up. A cow that is going to give a large flow of milk will drink a number of times in the day. One day in my own stable I watched one cow, and she drank twelve different times that I saw. She probably drank fifteen times altogether, because, I think, she would drink when I was out of the stable.

A Member: How long were you in the stable?

Mr. Glendinning: I was in the stable from about 8 in the morning. I was doing some carpenter work, and I worked till noon, and went back after that again. She didn't take very much at a time. About 87 per cent. of milk consists of water, and about 87 per cent. of the blood consists of water, and the average cow is about 50 per cent. water as she stands in front of you. The whole of the food that is taken into that cow is carried through the system by the action of water, and, therefore, you can see it is important that she should have water just when she wants it, and not enough to chill her at any one time. A good water-trough in the stable is one of the best investments you can have in connection with your dairy barn. I think the time has come when a farmer should have something else besides a pump. I think a windmill would be much better, and then you can have a separate tank in the barn and have your troughs arranged so that your cows can have water whenever they want it.

Mr. Grisdale: Do you condemn the feeding of white turnips?

Mr. Glendinning: I have never fed them, and I never had any experience in feeding them at all.

A Member: This gentleman might have meant white turnips, I know a great many dairymen who feed them, and they do not complain of the milk.

Mr. Grisdale: We have fed them, too. You can hardly feed Swedes without getting a flavor.

Mr. Glendinning: We only get a profit on that amount of food we feed over and above the maintenance of the animal. If we feed a cow a lot of expensive food we may feed her so well that we feed all the profit away. Here is a cow giving 40 pounds of milk, and that is her normal capacity, and you want to reach 45 pounds. You may do it by high feeding, but, in order to get that extra five pounds, it costs you a great deal more than it would to feed her to her normal capacity. It is just as bad to feed too high as it is to feed too low. A successful feeder is one who knows, by the look of his animals, that they are in a thoroughly good condition. If you feed too low you get too little, and, if you feed too high, there is a danger of breaking down the machinery of digestion, and, if you once break it down, you practically ruin the constitution, and you may never get the cow back again to her former condition.

Mr. Grisdale: As to feeding white turnips and Greystone turnips, we have fed them quite successfully, and we make butter out of our milk, and they have no injurious effects. We have never fed more than about 30 pounds a day. We have a nice clientele at home. We sell our butter, and we never have any remarks about the quality—about the butter being tainted:

but, if we fed Swede turnips, there was trouble at once. We carried on experiments to see how it would effect the milk, and we found after the patrons had been using it for two or three days they raised no objection; but for the first three days they wanted to know why we had been feeding turnips, and we informed them we would stop. But we continued to feed, and in three or four days' time they did not know whether we were feeding them turnips or not, and when we stopped about a month afterwards they wanted to know what was the matter with our milk. it had not as nice a flavor. (Applause.) But the moment we tried to make butter out of that milk there was a decided kick at once. We could not make butter out of the milk where we fed turnips; but for supplying milk for drinking purposes the people soon got used to it. We have fed from 20 to 60 pounds of turnips a day, but where we fed Swedes we did not feed over 30 pounds a day, and when we got up to 60 pounds a day the people would not take the milk at all. We fed only the roots, not the tops.

A Member: Did you aerate the milk?

Mr. Griswold: Yes.

A Member: Take the average cow in Ontario to-day, how much milk should she give in ten months?

Mr. Grisdale: We would not like to see less than 6,000 pounds.

A Member: Have you any idea what the average farmer gets from his cow in ten months?

Mr. Grisdale: He does not get 3,000 pounds. The average cow in Ontario would not produce 6,000 pounds, and, if she was properly fed. she would produce enough to pay for her food and leave a fair margin. We want the average cow to produce enough for her food and leave a good margin. and, to do this, she should produce about 6,000 pounds of milk a year.

A Member: How do you feed these white turnips, in the field?

Mr. Grisdale: Yes, and in the stable also.

A Member: Do you keep the butter that you make from turnip milk?

Mr. Grisdale: No, we do not keep at any length of time.

A Member: One of the patrons at our annual meeting said if the butter were made from the milk where the cows had been fed from the Greystone turnip it was very good if used at once?

Mr. Grisdale: Yes, our butter was used at once.

A Member: He said if kept for only a short time it was very bad.

The Chairman: It began to fester right off.

Mr. Grisdale: There may be a great deal in what the gentleman says, because our trade is one where we sell the butter for daily use. We never have any left over.

A Member: We have watched every can of milk that has come in in order to keep farmers from feeding turnips. I really think some farmers can feed turnips successfully, but there are a great many who try to do it who do not make a success.

The Chairman: The only safe thing we have found in our section is not to feed the blessed stuff at all. (Applause.) We try to make a fancy article so as to have them give satisfaction to the people in the Old Country, and if we send them that stinky stuff that is made out of this turnipy milk our trade will never amount to anything. You can grow other foods just as well, and why not raise something that is of some use, and do business properly. Why do they give ten cents a quart for milk in New York, when they get it from selected animals that had been fed by people who take pains to feed properly, and see that the stables are absolutely clean, and see that the people who milk the cows are clean, and dress clean, and everything else clean. And in this city of Peterboro we want the finest milk, and if a man will furnish the very best milk, he will soon get the biggest trade. I do not care how you feed the turnips, whether it should be done in the morning or in the middle of the night (laughter) it is bound to flavor the milk.

A MEMBER: Do you prefer keeping cows in all the time?

The CHAIRMAN: Keep them right in, what do you want them out for?

A MEMBER: I understood Mr. Grisdale to say that his patrons grumble the first two or three days that they were supplied with turnipy milk.

The CHAIRMAN: They did until they got used to the stink.

Mr. GRISDALE: Not from the Greystone turnip; that was from the Swede. They didn't grumble when they received milk from the cows fed from the Greystone turnip.

A MEMBER: I am afraid that all our controversy to-day has been in the line of encouraging the feeding of turnips, and I think it would be bad for our factories to do that.

The CHAIRMAN: I would like to shake your hand. You are a man after my own heart.

ADDRESSES OF WELCOME.

The meeting on Wednesday evening was largely attended. His Worship Mayor Best, read the following address of welcome:

To the President and Members of the Dairymen's Association of Eastern Ontario:

GENTLEMEN,—On behalf of the Council and citizens we very cordially extend you an unreservedly hearty welcome to the city of Peterborough, on the occasion of your twenty-ninth Annual Convention. We welcome you on more than one ground, because Peterborough delights in the duty of showing hospitality to its guests, especially when its guests are composed of the members of a body which represents great and important interests so intimately associated with the material prosperity of our farming community, and, through it, to the country at large.

We feel that Peterborough has been honored by being selected as the place in which to hold this convention, and by the presence of so many who are engaged in the great dairying business. We recognize the importance of the industry, which places in the pockets of our farmers, and through them, into the channels of commerce, a sum of thirty millions of dollars per year. At the close of the most successful year in the dairying industry in the history of Canada, it is an especial pleasure to welcome a body, which, in the course of the last generation, has contributed in so splendidly substantial a degree to the results which have been achieved.

The educative and moral impulse to progress proceeding from the Eastern Dairymen's Association is worthy of receiving especial emphasis. It does not seem to admit of a doubt that your Association has been mainly instrumental, not only in effecting the well being and prosperity of the farmers of the country, but in placing the products of our dairies, especially cheese, in the foremost rank, and capturing to the point of practical monopoly the British market, and thus bringing the name of Canada into prominence and favor, with the result of knitting more closely the bonds which unite us to the Mother Land.

Again we give you cordial welcome to Peterborough, confer upon you the freedom of the city, and express the hope that your deliberations may be productive of the greatest good to the important interests your Association represents, and that your Convention in Peterborough will mark a new era in the prosperity and progress which have resulted from its influence during the past thirty years.

HENRY BEST
Mayor.

E. F. MASON
Chairman Reception Committee.

Mayor BEST: I wish to add to this that nothing pleased me more than to listen to the able address delivered by your President, Mr. Derbyshire, on this dairy question. It struck me as being the most sound and commonsense talk to the people in a commonsense way that I ever listened to. (Applause.) If our farmers would follow the advice laid down by your President I see no reason why they should not make great improvement in the dairy industry.

R. R. HALL, M.P.: I desire to indorse the words uttered by Mayor Best in his address to you on behalf of the citizens of the city and county of Peterborough. I desire also to welcome and extend our hearty greetings to our visiting brethren of the Eastern Dairymen's Association. In looking up some of the records and history of the Ontario Dairymen's Association I find that it is twenty-nine years ago since that Association was originally formed. It is a very interesting matter indeed to look back over those last twenty-nine years, to see something of what this Association has done and contributed towards the success of the Canadian farmer.

We find that in 1876 the total exports of cheese from Canada was about $3,000,000. We know that at that time the quality of the cheese was not even or uniform, that they were not packed in regular size boxes, and that when the cheese landed in the English market a certain amount of it had a Limburger flavor, and in that way Canada was held back, not only in the cheese business, but also in the butter business and the egg business, and that militated against the Canadian farmer in the English market. But, by the influence of the Eastern Dairymen's Association and similar Associations, Canada is in a different position to-day, and we find that this past year we sent no less than $22,000,000 worth of cheese to the British market alone, and we also sent out $7,000,000 worth of butter, and in the neighborhood of $1,000,000 worth of eggs, and $15,000,000 worth of bacon. By those figures you can see that there has been a marked improvement in our export trade, due to the energy and united and co-operative efforts of the farmers meeting together in the various Associations. We find that Canada to-day sends to the English market six times as much cheese as the United States. Canada sends to the English market more cheese than all the other countries combined, and I say Canada has every reason to be proud of the excellent stand she has taken in the English market. We can therefore welcome with our heartiest greetings the Eastern Ontario Dairymen's Association.

T. E. BRADBURN, M.P.P.: I quite agree with all that has been said by the Mayor and by Mr. Hall in welcoming your Association to our city. I offer you the glad hand, and hope we will see you here often.

REPLY TO ADDRESSES OF WELCOME.

By J. R. Dargavel, M.P.P., Elgin.

I can assure you, Mr. Mayor, and Mr. Hall, and Mr. Bradburn, that we, the members of the Eastern Dairymen's Association of Ontario appreciate your very kind welcome here to-night. I am sure that it needs no words of mine to show to the people of Peterborough how much we appreciate the welcome that has been extended to us. We came here because we were invited by your representative to do so, and also by the leading dairymen of this locality. When I met your representative at Toronto last winter, he had found out by some means or other that I had some connection with the Eastern Dairymen's Association, and he immediately made a dead set that I should use what little influence I possessed so that the annual meeting of the Association should be held here in Peterborough. I said to Mr. Bradburn that there were several towns and cities in Ontario who were asking and extending to us a very cordial invitation to hold our annual meeting there, and that it would be impossible until the meeting of the Directors to give a decided answer. At our annual meeting of directors at Toronto this fall we were met by a deputation from Peterborough, and we were offered the freedom of the city, and among other things, it was promised us that the chief of police and all his force would be taken off duty for three days. (Laughter.) We then decided that Peterborough was the proper place in which to hold our next annual meeting, and we are now meeting in Peterborough, and I trust the meeting will have that success that has characterized all our meetings for many years. I believe this is the first meeting this Association has held in Peterborough in twelve years.

We have heard through the press, and through our instructors, and through Mr. Publow, our chief instructor, of the grand work that has been performed in this section of the country, how your factories have been improved, and how your dairymen were up-to-date men. And we heard another thing from Mr. Publow, and that was that Peterborough was outstripping our beloved Brockville section. (Laughter and applause.) We will see to it that the Brockville section, for which our President also speaks, will come to the front: and we will see to it that no matter how Peterborough improves it won't carry off all the laurels. I am sure that it would not be at all interesting, nor would it be right to take up the time of this meeting by going into details of the work of this Association, since it was formed some thirty years ago, but I would just say that this Association was formed by men who were alive to the dairy industry of this Province. It was formed to promote an interest in dairying. I do not want to be egotistical so far as the Eastern Dairymen's Association is concerned, but still it is well to know that this Association has done wonderful work, and to-day we are in a position to turn out the finest quality of Cheddar cheese in the world, and we claim that this Association has done much towards bringing about this state of affairs. We have gone on from year to year, and instead of standing still we have tried to improve. We started in with two or three instructors some years ago, and now we have twenty-six instructors, besides the chief instructor. We have these twenty-six men on the road every day of the dairy season this year, and we were very careful in the selection of these men. We selected men who were well up in their business, and were well qualified to impart information. The dairy business might be compared to a chain, and there are many links in this chain, and the saying is a chain is only as strong as the weakest link. There is much work still to be done in promoting the objects of our Association and strengthening the weak links.

From the time the milk is delivered from the cow until the cheese is landed on the counter of the consumer it passes through many hands. It first has to be taken care of after coming from the cow and delivered in good order, and then to the factory; and then it requires a good clean factory where it is made up with all the proper appliances, and it requires skilled workmen to make it into a first-class article, and a good curing-room to properly cure it, and it requires to be transported to the railway station in proper order, and the railway should be furnished with refrigerator cars that should be kept at a proper temperature until delivered at Montreal. Then it should be well taken care of until it is placed on the steamer in a cold storage compartment, and kept there until delivered in England, when it should be properly taken care of at the dock, for it happens in some cases that it suffers deterioration there by not being properly taken care of. There are so many things to be looked after in this matter that it requires considerable work, and we as an Association have tried to strengthen every link in this chain. We have tried to make our needs felt with the Governments, both the Local and the Dominion Government, because they have to help us in every way. We are indebted to the Provincial Government for certain amounts of money to meet the expenses of carrying on this industry, and I wish to say here that this Association owes a deep debt of gratitude to the Hon. John Dryden for the assistance we always received from him when he was Minister of Agriculture (applause), and for the great interest he took in this work: and I will confess to you, Mr. Mayor, that when we found we had lost the services of Mr. Dryden last winter, that although some from political reasons may have thought it was all right, still, we as members of the Association felt a certain amount of fear that perhaps we, as an Association, would suffer. But I am most happy to say here to-night that our fears are all dispelled, and we have found in our present Minister of Agriculture that he too is deeply interested in the welfare of this Association, and that he has never refused any reasonable request that we have made to him. (Applause.) It is only justice to the Hon. Mr. Monteith to say that he has aided us most generously. I shall not go into statistics to show how much our production has increased, you have heard that from the address of the President this morning, a very carefully prepared article, and we had it also from the address of Mr. Hall, which we heard a short time ago.

I will just say that if you feel interested, and if you feel we are doing good work, and if you feel this Association is an advantage to this country, and to this Province and to this section, we would ask you people of Peterborough to assist us by becoming members of this Association, which only costs one dollar. It gives you a great many privileges and you will be assisting in this good work.

I thank you Mr. Mayor and gentlemen for the very cordial welcome that you have given the Association, and trust that when we leave here you will have as good an opinion of us as you had before we came. (Applause.)

CANADIAN AGRICULTURE.

By G. C. Creelman, President O.A.C., Guelph.

I am not Scotch, but I take the privilege of taking my text this evening from a Scotch anecdote which was told me coming down from Guelph only a day or two ago. It appears that the Highland Scotch have a habit of using more pronouns than is necessary in the English language, and one minister took the text: "The devil goeth about like a roaring lion, seeking whom he may devour." He divided the text into three heads, bringing the pronoun "he" into each of the sub-heads, and said: "My brethren and my sisters, we shall divide this into the three following heads: first, who the devil he was seeking; second, where the devil he was going; and third, what the devil he was roaring about." And so in speaking on Canadian agriculture to-night it has occurred to me I cannot do better than divide my subjects into three heads and say, 1st, Who are we? 2nd, What are we doing? and 3rd, What are we going to do about it?

As to who we are I may say that we are Irish, we are Scotch, we are English. Some other nationalities have come into Ontario, but we are all practically English, Irish and Scotch, and we have produced a race of people that is not surpassed by any other nation in the world. The intermingling has been so fine and fixed that I can say in the words of the song, "Cursed be the man who tries to divide us now." Many of the young men and the young women of this country have gone from here, and have made a name for themselves in the great Republic to the south, that has taken so many of our boys and girls. Chicago now has 25,000 of our young men in its midst, and Detroit 6,000. In fact, one-third of the population of the whole State of Michigan is Canadian, and we get back this message from that country: "We like your young men for three traits in their character; first, they are enterprising, and they are generally intelligent. When we employ them in our stores or in our factories, or where you will, we find they stand first and foremost among the rank of the young men that come to us, because they have intellect to take up what we say to them, and they go ahead and do the work without asking too much instruction. In the next place, they are intelligent and hard-working, they apparently have had to work very hard, their parents were the pioneers in your country. They are industrious, and do not watch the clock to see when six o'clock comes around. They are not only industrious and intelligent, but their morals are good. We do not find them coming to the shops in the morning with bleary eyes. We find that they have saved their pennies, and are building up for themselves treasures on earth. The first thing we know they are asking for partnerships in the business, and they usually get them." These things come back to us as the attributes of the men who have gone out from this country.

It would not be fair to speak only of the boys. I have a word to say for the young ladies who have gone to the other side, particularly along the line of trained nurses in the hospitals of New York, St. Louis, Chicago, St. Paul, and a number of the larger cities of the United States. The Canadian girls hold some of the very best and most responsible positions in these hospitals, and they are acknowledged by the physicians of that country to be among their best trained young women for the work. (Applause.)

What about those who have remained at home? What about the farmers of Ontario? What have they done? Just before election time we hear that they are the backbone of the country, and we hear it sometimes after election time by those who are sincere. I want to say to you here to-night, as one who is interested 365 days in the year directly in your work, that no nation and no portion of any nation has done in the twelve or fifteen years along agricultural lines what has been done by Ontario. I do not say that to you for the purpose of flattering you, but what I say to you farmers of Eastern Ontario particularly, that without any appreciable increase in population or acreage the farmers of Ontario have almost doubled their output in ten years, and I hope the newspaper men will take that statement that it may go on record, that the output from the farms of the Province of Ontario has doubled in ten years. And this has been done by superior methods of our agriculturists in handling their farms, produce and live stock. (Tremendous applause.)

Then we have the men. What are we doing? You will pardon me if I make some personal reference to the institution with which I am connected, the Ontario Agricultural College. It has been one of the agencies that has produced these results. I have not been long enough connected with it to take any of the glory to myself, but I say it has been one of the agencies that has been at work for the last thirty years, building up this great industry which you represent. During the year 1905 we had 1,046 students in attendance in the different classes of the Ontario Agricultural College; these were boys and girls, mostly boys, because we have only recently added the ladies' department to the Institution. The boys from the College have gone about during the past thirty years, some to one place, and some to another; but the great majority of them have gone back to your farms and your neighbors' farms, and have worked out their own agricultural salvation, and they have been instrumental in raising this output of $250,000,000 that annually goes out from the farms of this Province.

The Experimental Union, an organization of young men at the College, and practical farmers, has been a great agent in disseminating information in experimental work. You hear a great deal about experiments, and the average farmer looks askance at the word "experiment," and feels that it is something they do at College in which he has no part. I want to say to you that the Experimental Union during the past year had 4,050 farmers on their own farms in the Province of Ontario conducting experiments along lines of the better production of grasses and grains, and forage crops and roots, and they reported back to the College once a year, co-operating with the Experimental department, and in that way they have been able to do great things for the Province. Our Experimentalist in 1889 among other things brought out from Manchuria a double handful of barley, which a great many of you know as common Mandscheuri barley. That was the only seed, so far as we know, that was ever brought to this country direct from the country from which it came. We planted that on a small plot the first year, and then selected the largest seeds for the next year and sowed it. Then we began to send it out to the different farms, and this year that barley produced from four to five bushels more per acre than the average barley raised throughout the Province of Ontario. It has been planted on our ordinary farms to the extent of one-half a million acres; and if you take one-half a million of acres of grain this year, 1905, each acre growing four bushels of barley per acre more than they would have grown had we not brought out those two handfuls some years ago, you can realize that at 50c. a bushel the Ontario Experimental Farm and College and the Ontario Department of Agriculture itself, and all the expenses connected with these three great institutions, would have been paid by that product alone. Hence we feel justified in calling attention to facts of that kind as bearing upon our work. We do the same with wheat, oats, rye, peas, mangels, sugar beets, etc., and we are getting results of a similar nature all along the line.

We have the Superintendent of Farmers' Institutes to-night on the platform. He is a modest man, and I want to say of that agency of the Ontario Department of Agriculture, now so ably presided over by the Hon. Mr. Monteith (applause), that it is one of the best institutions we have ever had in Ontario, and through it we have been able to raise agriculture up to the plane in which we find it at the present moment.

What are we going to do about it? Are we through? Have we finished the race? Have we come to the end of the course? And are we ready to fold our hands, and say: "We are the people, God bless us. Let us quit this work and have a rest." I say "No." (Applause.) We have just got to the point where we have learned that we do not know very much about it. We have got to the point where we find it necessary to send Professor Zavitz all over the world. He left on the first day of this year to go to California, to see what Mr. Burbank is doing, and study his conditions for three or four months. Then we will go to Great Britain, and go all over the Continent, to see if they have anything better there. Because we say that anything they have in the Old World or in any other world is not too good for Ontario. (Applause.) So we are starting off after new things all the time.

I feel that I should not say much about your own business, but I want to say that a good deal of agitation has been brought about through the influence of your directors. Your Association has, too, better cheese factories, and better factories throughout the Province of Ontario. I am not here to offer any advice to you, but I just want to say that in the matter of licensing factories, it is a question in my mind as to whether it is a matter of cutting off this or that because you see this or that wrong, so much as it is a matter of sanitary inspection along these lines. It is my experience in connection with the different organizations with which I have been connected in the Department of Agriculture in this Province, and with which I was connected with for a time in the United States, that the great harm to industries of this kind has not been done maliciously in the factory or on the farm, but it has been done through ignorance, which they are quite willing to clear up as soon as a remedy is shown them. If inspectors are to be appointed for these factories, particularly in the Province of Ontario, that work should not devolve upon the instructors who are doing so much good work now. I believe it will prove diastrous if the instructors are asked to act as detectives. I believe the instructors should go in and be received with open arms by the makers, and they should co-operate together. I just throw out that suggestion in passing.

Now I want to say something about public schools. We have a most excellent system of public schools, and we have got along with that system so long that we have got to the point where we must send somebody out and put new life into the school teaching as it is taught now in the rural schools in the Province of Ontario. I do not say that in a criticizing mood, because it is so easy to find fault; but I do say that the boy from the farm who is going back to the farm ought to be taught, in his own public school near the farm, some of these things which are going to be useful to him after he returns to the old homestead. (Applause.) I think that is broad enough ground for us all to meet upon. That child should be taught the different kinds of weeds and weed seeds; he should be taught the different kinds of earth formation and the difference between clay and sand, and clay and sand when mixed together, and the different kinds of loam; and he should be taught the retentive properties of different soils for moisture and the principles of cultivation.

And the girls in the same schools should be taught along systematic lines how to make little stitches in early life, and how to laundry simple things before they come to have to do it without instruction, and how to cook simple things; and at least learn the principles underlying the preparing of foods.

In a certain school which I visited I saw little children of five and six years sewing, and saw little children cooking, and saw little children of seven and eight and nine years of age doing laundry work in the school, and learning the principles of it, and becoming interested in it, and the teacher assured me that they do even better in their other classes in addition to that. Therefore, I say there must be something in it, and the schools in the country ought to do better. Why must we wait for this sort of thing? Some of you rural school trustees can go back and adopt it right away. But you say we are paying our teacher $250 a year now. You are paying your cheese maker more than that or you cannot get him. You will get just what you pay for. It is a big question to enter into, and I have only time to just drop a suggestion. But I want to say that you must not wait for the Legislature to legislate or make laws, or do something by which your teacher will be compelled to come to you at a certain salary. The law at the present time enables you to do all these things which I have been telling you about, and it is up to you now to carry these things out.

The last point I wish to make in reference to the older farmers, and it is the absolute necessity for more co-operation in business. Every time I pass a factory and every time I see fruit delivered on a depot platform the thought comes to me, "How long, oh, Lord, how long are we going to allow this thing to go on without co-operation?" When we find all the other industries co-operating to the extent that their business is on a financial basis. Now there never was a time in my own life that farm products were not cheaper in the fall than at any other time in the year, and it always struck me as being very funny that the farmers' products were lowest at a time of the year when they had most to sell. Some persons say that it quite natural, they have more of it. But I turn and look into the iron industry, and I find there never was a time in the history of the world as at this moment in the month of January when they had more iron, and, yet, there never was a time when iron was so high. Simply by co-operation and standing together they are enabled to dictate to the world what you and I shall pay for iron, and iron is not as essential a commodity as our bread stuffs and our food stuffs. We have in this Province about 200,000 heads of families living on farms, with an average family of five—that is the size of my family. That gives us 1,000,000 people living on farms in the Province of Ontario, and, yet, we stand here and let every industry come along and combine itself and hold us up for whatever they care to charge us.

The Chairman: That is the style of men we have working for us in Ontario. I have been delighted with that address. There is a lot in it, and I tell you when I heard him talking about teaching these girls to do some cooking and these useful things about the house, do you know my heart warmed toward him. You do not know how anxious I was that he would teach these people something in that way, because we have very beautiful young girls in our town who are getting married who could not cook a loaf of bread if their beloved husbands had to starve to death. They are prepared all right enough to marry him, and they will marry him good enough. They will do that up in all sorts of style; but if you ask them to do anything in the housekeeping line they have not that knowledge. It does not take from your dignity to learn to do these useful things, and it ought to be in the heart of every young woman in the land that she should learn to do these useful things. I had the pleasure of visiting the Guelph College, and, oh, how I loved those beautiful girls! And to see the style of them, and the way they went about the cooking and the other work that they were learning to do! And I thought to myself if I could only teach our town girls to do some of those things. (Great laughter.) I now have great pleasure in introducing the Honourable Nelson Monteith, Minister of Agriculture for the Province of Ontario. I am sure we will be delighted to hear him. He has furnished us with money to carry on our work, and given us more than we ever had before. He has furnished us with a large number of instructors, and has been good to us all the year through. I have great pleasure in introducing him to you. (Applause.)

ADDRESS.

By Hon. N. Monteith, Minister of Agriculture, Toronto.

I am sure, after the very flattering introduction I have received at the hands of your President that any remarks I may make may, possibly, rather take away from my reputation than add to it. I think I can, possibly, come here without having to make any excuses for being among you, and for the reason that I have been identified with the dairying industry from my youth upward. Away back in the early sixties, although I cannot remember to the very beginning, there were certain dairying operations undertaken in the western part of the Province not very far from my place of birth; and early in life I had the privilege of carrying down to the cheese factory on the adjoining farm what to-day is doing so much for the upbuilding of agriculture in this country, namely, the product of the dairying cow, and I there learned a great many of the secrets of the manufacture of cheese. As a small boy I remember well having the privilege of sampling the curd from day to day. And not only that, but in the older days of the business when the hot iron test was in common use, I remember well, with a certain amount of boyish pride, taking down to that factory what was known as the rennet. And I remember years afterwards, when it was my fortune to drift down to the College at Guelph and become associated with such men as you have seen on the platform a short time ago, where, under the guiding hand and eye of Prof. Robertson, I studied cheese-making at closer range. So you see, though I may be an amateur, I have some of the professional knowledge of the business, and I am like my good friend, your president, Mr. Derbyshire, I have profited some by having the knowledge of both the amateur and the professional side of the business.

To-night, regarding the great industry to which we all pay tribute by our presence here, there is one thing I wish to say it has done to a greater extent, possibly, than any other line of agricultural industry. It has put the farmers of this Province on their feet, so to speak (applause); and I think, possibly, the eastern portion of this great Province of Ontario has a truer appreciation of that fact than any portion of the Province. You have in this splendid portion of the Province, eastward to the Ottawa River, one of the great things which make for success in the business, and that is pure water. It is one of the great essentials to success in the dairying industry; not alone for the use of the animals that produce the fluid that make the cheese, but because of the cleanliness that is too often overlooked in many of the older and out-of-date factories. The plentiful use of water has a great deal to do with the quality of the product, and I think I am safe in saying to those who have not a more intricate knowledge of the business that it is essential to success in the manufacturing and proper making of cheese.

To-night we are gathered together in this splendid hall in this prosperous and enterprising centre of industry—I was going to call it the Electric City. I do not know whether that would be a synonym sufficient to carry with it a full meaning, but in itself it is a name that may mean very much in years to come, when the great manufacturing centres of this Province will take more and more of the product of our farms, and thereby give us a home market that will make us less dependent upon the old land and Europe. And it is for the farmers to-day to keep steadfast in the maintenance of a good product in every line of production. It is well for them to look into the future and watch for every opportunity whereby they can more properly fulfil every want of the rapidly increasing population in this Province of Ontario. The time is rapidly coming when our manufacturers in Ontario are bound to require more men to come to their assistance to make the necessary implements for our great West. The necessary implements for every line of industry in that great West must largely come from the Eastern Province, and we here as agriculturists must so shape our business as to maintain a wholesome artizan life in our midst. Give them of the production of our farms, and of the production of our vineyards and orchards, so that we shall have among us a sturdy class of artizans. In maintaining a healthful body better skill can be put into our producing.

Not only that, but when I come to consider the great responsibility cast upon the Department over which I have the honor to preside at the present time, with its many ramifications and many lines leading out from a common centre, it makes me feel at times that a vast responsibility rests upon me and upon those whom I have gathered around me in seeing that the great undertaking that we have in charge shall be most effective.

It has been my good fortune, or misfortune, to follow the footsteps of a man around whom this Department has grown up, and I have to some extent been literally pushed into a position most difficult to fill from the fact that this great Province has been going on growing, and men have been utilizing different lines of help in the great calling of agriculture. In one of these lines the dairymen have from year to year come together in assemblages of this kind, and have consulted together in order to devise means whereby they might advance their mutual interests. Their counsels, I think, have been wise. At the beginning I remember so well that American instructors came over into Ontario and went through a number of our factories, and were teaching our makers improved methods. But to-day, happily, conditions have changed, and we are not depending upon our American cousins for instructors in this great line of industry. To-day we have among us men who are looked upon as experts throughout the civilized world, men who have reputations, men who stand at the forefront of this great line of industry.

I am glad to say that such gentlemen as your President, and Mr. Dargavel and others came to me even before I got well settled, and, by their persuasive arguments, induced me to even branch out further in the line of instruction work and in the granting of a larger sum for the promotion of this great industry. (Applause.) They came to me and they laid down their proposition, not from any selfish ends apparently, but from a great desire to further the interests of the whole people, and they asked for more instructors, and they got them. Not only that, but believing that an increase in the cost of living justified an increase of wages, we granted them a reasonable increase in wages. (Applause.) And I believe the results of the past year will justify me in saying that these men earned their extra remuneration. And so long as we have men who give such services as these men are giving and have been giving, not only in the eastern part of the Province, but in the western part as well, so long as they give the service and give it so well, so long, I think, the Department at Toronto will be fully justified in following up the present course of increasing from time to time their salaries as the industry matures. (Applause.)

Then, again, we have in this great dairying industry so many other lines that lead out from it, and are contributory to it. As your representative, Mr. Hall, has so well said, we have the bacon industry, which, to a great extent, is a branch of the dairying industry. In fact, they almost go hand in hand—the dairying industry and the hog industry. And while men may differ as to whether we should allow our American cousins to come in and share with us the advantages of our packing establishment or otherwise, we all agree that as agriculturists we cannot pay too much attention to the maintenance of the high reputation we have gained in the markets of the mother land.

Again, I may tell you that in common with this great industry we have another side. The President of the College at Guelph has told you so eloquently of one of the greatest factors that enter into this question, namely, the intelligence of the citizens who enter into this great industry—the use of intelligence in the pursuit of this great industry. It was my privilege last spring, when at Kingston at the breaking up of the Dairy School there when these instructors were going out fresh from the hands of their teachers to carry that enthusiastic work to the producer, namely, the farmer. When these men were leaving on that occasion I remember well of having the privilege of seeing a lot of bright young men full of enthusiasm and the vigor of manhood ready to go out to do battle in this great cause, and it was my privilege then to tell them of their duties, and what I conceived these duties to be. I told them they were not to be merely satisfied to talk to the maker in the factory, but that they were to go to the home of the producer, talk with these men, make them feel that this was a co-operative business, that they were part and parcel of it, and had much to do at their end of the business in making it what it ought to be.

This has been a singularly fortunate season, especially in the production of agricultural products and in the dairying line particularly, and when you come to consider the vast increase in price—say two cents a pound. This does not seem very much, yet in the aggregate what does it mean? It means a very large sum of money that goes directly to the producer; because the cost of making is not materially changed, so that any increase in price that may come from year to year is largely so much found money to the producer. I hope that this present good fortune which has come upon us of increased price for our products will be an incentive to the producer to give a better product, and to take better care of the animals that are producing this product. See to it that no means are neglected to secure a pure product in the milk line. This is something that cannot be too much emphasized.

You have had to-day, and you will have to-morrow and the next day, sessions of your convention, and I trust that those who may be fortunate enough to be in reach of this centre will gather to hear discussions from day to day. These assemblages are almost essential to our national success. The best results come from gatherings of this kind; and it is hopeful to me as a young Canadian having faith in the future of this great country that our leading citizens—not only agriculturists, but men of affairs in other lines, men who have the interest of our country at heart, the leading financiers of our country—are beginning to turn their attention to gatherings of this kind, and to look into the possibilities of the business, because there are great possibilities, greater possibilities than in many things over which men are becoming excited to-day. Consider the vast amount of talk we have heard about this Cobalt region which is taking the attention of a great many of our citizens. That wonderful discovery where minerals are found in vast and paying quantities is almost at our doors. Almost every day you notice in the papers companies being promoted with the name "Cobalt" somewhere in their make-up. Yet, vast as the discoveries there have been—something over two million dollars' worth of material has been shipped out from there—what is all that to excite people as compared with the increase of this very year in the value of our dairy produce? (Applause.)

When these things are put in their proper light we find that the great interests of this country at the present time, and I think for many years to come, are bound up in our agricultural products. When we come to consider that during the last fiscal year ending in June, the resources of our forests and timber were some $32,000,000, our mineral resources $32,000,000, our fisheries $15,000,000, and the export output of our factories some $21,000,000. Take all these and put them together and what do we find? We find a very vast sum of wealth, a vast sum of money. Yet all combined they scarcely more than equal the agricultural products of our Province, which amount to some $92,000,000. This begins to make us realize the vast importance of a convention such as this that leads up to the betterment of that great industry. Through the medium of our Farmers' Institutes and our Experimental Farms, and our various Associations that are doing so much, and that, I hope in the near future, may do more, we hope to be able to spread knowledge that will advance the interests of the agriculturists of this Province. You as citizens have a duty to perform. It is your duty to uphold these institutions as far as it is within your ability, because they are building up among us a condition of things that makes for a healthful and progressive national life, and these are things that in this country we must largely bring about by our own efforts. But remember that one thing is to be avoided, and that is paternalism. As the President of the College has well said, do not always look to the Government at Toronto in every time of need. We, as a people, are able, as a rule, to take care of ourselves individually, and I think collectively, and each of us should feel our individual responsibility in matters of this kind. With the funds at our disposal at Toronto it is our desire upon every occasion to help and promote every interest that may be for the general advancement of the Province. In this district you have a dairying section, and I understand that the last report of the output of dairy products from the county of Peterborough is half a million of dollars, and that is something of which you may well feel proud.

In conclusion, I am sure that we are delighted with this splendid and hospitable reception we have received in your city. You have here a great manufacturing centre, and I believe it is bound as years go on to become even more and more a manufacturing centre, from the fact that you have electric energy in excess possibly of almost any other city in Ontario. And I believe I can safely say that you have a smaller debt per capita than any other city in the Province. With these advantages, I see no reason as years go on why you should not go on from greater to greater things and improvements, and become one of the greatest cities of the Province of Ontario. (Applause.)

ADDRESS.

By Geo. A. Putnam, Superintendent of Farmers' Institutes, Toronto.

It gives me much pleasure indeed to meet with the people of Peterborough and the surrounding country, more especially so because I have many Institute correspondents in the vicinity of Peterborough, and not only correspondents among the men, but a number of ladies. It will give me great pleasure to meet these people who have done so much to further the work of both the Farmers' and Women's Institutes.

I knew that the Minister of Agriculture would speak to you about the dairying industry on broad lines, because he views the agricultural industries of the country from that standpoint. He does not take a narrow view of any of these questions. With him it is a matter of efficiency and thoroughness, and the dairymen of Ontario may rest assured that the Minister of Agriculture will always stand by them so long as he sees results from the expenditures.

You will excuse me, I am sure, if I saw a few words to you about Farmers' Institutes and Women's Institutes, two organizations which are doing so much to disseminate the gospel of advanced agriculture and that which goes to make for the betterment of home conditions on the farm and in the homes of the towns and villages. In the eastern part of the Province we have not, I am sorry to say, so many Women's Institutes as in the west. I do not know why this is, but I am perfectly satisfied that the people of Peterboro and the other counties are well qualified to carry on the women's work to the benefit of the localities concerned. I would like to see Women's Institutes formed in every section of the eastern part of this Province, and I hope those of you who come from districts where there are no such organization will see to it that the home makers are given an opportunity to form an institute.

It is not generally known that at the present time we have some 8,000 members of Women's Institutes in the Province of Ontario, representing 275 different organizations. These members together with a large number of other women from town and country meet every month or two for the purpose of discussing questions which are of interest to them as homemakers, and we hope to see the day when there will be an organization in every locality. Most encouraging reports are received almost every day from one or other of the organizations which were formed during the past season. A report came from an Institute in east Korah, an organization near Sault Ste. Marie, a few days since; and the excellence of the papers prepared and delivered by its members speaks volumes as to what we may expect from the new branches in the northern part of the Province. The reading of these papers is beneficial in the highest degree not only because of the information they contain, but from the fact that they promote sociability and friendliness in the rural districts. The Department of Agriculture will always be only too pleased to assist towards organization. Speakers will be sent and full information as to organization furnished upon application.

We are always expected to say something along dairy lines at the Dairymen's Conventions, and it gives me pleasure to present two features of the work which appeal strongly to me as I come in contact with proprietors, makers, and producers from time to time.

First. There is great necessity for the farmers of this Province to take better care of their milk and to make better provision for the handling of the same upon the farm; and 2nd, the proprietors of the factories must do something to increase the efficiency of their manufacturing establishments.

If we can only impress upon the farmers the importance of care and thoroughness in this matter as well as in other farm practices there will be a marked increase in the profits, and after all it is for the profits that we are all working. If the farmers will pay more attention to selecting their seed grain and weeding out the poor cows, and doing everything they possibly can to better the quality of stock and grain, I am certain that they will be much the richer. Very few of the individual farmers realize that they have a part, an important part, in the greatest industry in the Province of Ontario,—that he is a part of it in so far as he does his share; and if he does this part well he helps the whole business along. Farmers come to such meetings as this, and after it is over say they had a grand meeting, and they come to the Farmers' Institutes meetings and at its close sing the praises of the speakers and become enthusiastic over the dairy industry. Do not at the close of this Convention state "We are going to do wonderful things next summer," but each man should say "I am going to do wonderful things next summer" and "I am going to do my part in this great work during the coming season."

I appeal to the farmers of this section to take better care of their milk from the standpoint of cleanliness. If a manufacturer in the city showed the same carelessness and if he allowed such filth to get into his product there would soon be a revolution among the people. Why should the same principle not be applied to the dairy industry. The farmer should not keep his milk in a place where it is apt to absorb odors, or become contaminated with dust and dirt. Some farmers are continually saying, "I intend to put in ice next year, and I intend to use improved methods so that my milk will be kept in first class condition." We do not care for your intention: we want you to have a purpose, and we want you to say to yourself, "I purpose putting in ice, and I purpose fixing up a proper place to keep my milk," and then go to work and do it. When a farmer purposes—makes up his mind fully—to make improvements, then we can hope to have the whole industry on a better basis.

We often hear it said that farmers are fault-finders, and when we come to think of it we realize that probably he has more ground for fault-finding than his city cousins, for the reason that he is more dependent for results upon the conditions of the weather than any other class. A storm may come along and sweep his whole crop away, and the results of weeks of work and considerable expenditure be destroyed; and if he grumbles the man in town is apt to say, "You farmers are always grumbling." I wish that many of you would become fault-finders and become dissatisfied with the factory to which you are sending your milk. If the conditions surrounding your factory are such that it is practically an impossibility to manufacture a first class article, then it is time for you to find fault and compel the proprietor to make improvements which will be in keeping with the demands of a first class trade.

I was very glad to-night to hear President Creelman make mention of a method by which we can compel proprietors to take steps to improve their factories. If we ask a child to do a thing several times, we know what will generally happen. We have been telling the proprietors what they should do. Instructors report from time to time that they have gone to the maker, and they have gone to the directors and to the individual producers and have said to them, "Why do you not do something to have this factory improved?" And yet the factory has not been improved. It is time that something was done, and before this Convention closes I trust that the directors of the Eastern Dairymen's Association and the members will devise some means by which we can compel all factorymen to put their factories in a proper state, so far as sanitary conditions and water supply are concerned, to carry on business in an up-to-date method.

I was glad to hear the Minister of Agriculture give a warning to the farmers of old Ontario, that they should think many times before investing any money in Cobalt or in any other mining centre. The best mines of Ontario are the farms; and probably the most valuable claim is that of "Dairying." I would say to the dairymen here "Do not take a claim in Cobalt, but place your confidence in the old and well tried mine of "Co-bos."

Mr. THOMAS MCGILLICUDDY, of Toronto, was called upon for a few closing remarks, in which he told a couple of stories germane to the occasion. One of these was about the famous Chicago frog, said to have been on show in a glass jar at the Exposition held in that city a few years ago. This frog by some means got into a can of cream destined for a Chicago restaurant.

With the indomitable pluck that characterizes the denizens of the Windy City, however, it determined to make the best of the situation; and so energetic was it in its endeavors to keep afloat, that when the restaurant man took the lid off the cream can he found the frog, with a gleam of triumph in its eye, sitting proudly on a pat of beautiful gilt-edged butter that had been churned in its efforts to win out.

CHEESE MAKING.

By Geo. H. Barr, Chief Instructor Western Dairy Association.

As secreary of the Western Association I would like to give you all a very cordial invitation to come to Ingersoll next week and visit our western town, the home of the dairy industry in Canada, the first town in which a cheese convention was ever held in Canada. We feel that we are going to have a splendid Convention. In connection with it we are holding an exhibition, and before I left home yesterday morning we had over 160 cheese entered for competition, and between 50 and 60 packages of butter; so that we are going to have a very good dairy exhibition as well as our Convention, and would be very glad to have you come up and visit us.

In taking up this subject of cheese-making I am not going to attempt to cover the whole subject. I would rather just touch a few of the essential points that I consider necessary in making fine cheese, and allow you to do most of the talking. I am convinced of this that the greatest problem we have to solve in the dairy industry is getting the milk and cream delivered to the creameries and cheese factories in proper condition.

We are doing all we can as instructors to accomplish this, but I would like to ask the question this morning, are the cheese-makers and factorymen doing all they can to solve this problem. I wish you would ask yourselves the question. Is there not far too much foolish competition in trying to get patrons from other factories? I say foolish competition, because I do not think there is anything more foolish in our industry to-day than between factorymen and makers trying to get milk from the other fellows. The result is that a maker scarcely dare send a can of milk home for fear he will give in to the other fellow. I think that is one of the greatest weaknesses we have in working out this problem of getting better milk. If you as makers and factorymen get closer together, and come to some understanding as to who will be your patrons, I think you will do more in one month in the spring before you commence operations than the instructors can do in ten years.

The next point is that we are holding public meetings, our instructors are visiting the patrons, and are trying to give them a better education along the lines of taking care of their milk; but unless the cheese makers will do something more than they are doing to-day, all this work to my mind is about useless. I think that educating our patrons is the right thing to do. We must get them to know exactly what they should do in taking care of the milk on the farm; but if the cheese makers continue to take in the kind of milk some of them are accepting to-day, we may just as well give up the question of trying to improve the conditions on the farm. Why? Because in any line, the producer of the goods will not deliver a better quality than the manufacturer demands. If you take in tainted and over-ripe milk continually during the summer, you will receive that kind of milk; simply because the farmer comes to this conclusion: "If I am taking care of my milk in such a way, and it is not returned, and I do not hear anything about it, that is all that is necessary."

As the patrons become better acquainted with caring for the milk, you should select milk more closely, and gradually work it down, and you will get your patrons educated, and you will never be asked to take milk that is over-ripe. I think it is up to the makers to set a standard for the quality of the milk they will receive; and if you set a high standard of quality, you will receive a high quality.

In western Ontario one of our best makers told me that this year he received the best milk he had received in the factory in eleven years, and this was one of the worst years we have had for taking care of milk. I asked him how he accounted for it and he said, "I have been selecting the milk closer this year than I ever did. I have been sending home more tainted milk and over-ripe milk than I ever did before," and then he said, "I will select closer next year." I think the result will be that he will cut doubtful milk out altogether, and if our makers would do that we would have a better product. I do not find any fault with a man for doing wrong if he does not know any better, but if he knows better then I think you should get him to do better. There is about 25 per cent. of the farmers you have got to make take care of the milk, and the other 75 per cent. will take care of it because they want to.

In thinking over the situation I find there is very little that is new to say about making cheese. I think that one of the most essential things for a man to know who is going to be successful in making cheese, is how to make and use a pure culture or starter. If you are going to have a uniform flavor in cheese you must have something to control that flavor. I do not believe any of us will live to see the day when we will get all the milk delivered at the factory free from outdoors but when that time does come, I am willing to step out of the instructor business, because there will be no use for me or Mr. Publow, or any of the other instructors. We are coming closer to it all the time. If there are flavors in the milk, the best thing to do to overcome these flavors is to use something that will counteract them, and I do not know of anything better than a pure culture. I know of factories in the west to-day, where you can get the same flavor through their cheese, the whole season through, and if you ask them how they account for it they will say it is the culture. I believe it is essential to have a pure culture in your factory every day of the year, hot weather and cold weather, and you must know how to use it.

Another thing you must understand is the use of the acidimeter. Without knowing how to use an acidimeter, or without having one in the factory, I believe it is almost impossible for you to carry on a culture and keep it in proper condition. It is also very difficult for you to cook a curd properly without an acidimeter, and I believe the proper cooking of the curd is the most important work in the making of cheese. I do not know how many acidimeters you have in Eastern Ontario, but I know in the west there are very few factories without them. As I said, cooking the curd is the most important point in making cheese. If you will keep two things in mind when you start a vat of milk, I think it will help you greatly. You must cut the curd according to the percentage of acid in the milk, and you must cook the curd according to the development of the acid while you are cooking it. Now if you get these two things in your mind properly, and work them out, I will guarantee that you will make fine cheese, because a man who can cook the curd properly need have no fear that the quality of his cheese will not be all right. I do not care very much how you handle that curd in the curd sink, or in the vat, but the point is that if you cook that curd properly and cook it well, there will be not much wrong with your cheese. If you have studied the development of acid in the curd, the more you study it and the more you think about it the easier it will be for you to make fine cheese. I know that the men in the west who know the most about the development of acid in their curd, or during the process of cooking and handling the curd afterwards, are the men who are making the finest cheese.

Another point that I think that some of our makers in the west have been carrying to excess is stirring the curd dry at the dipping point. I think you can overdo this the same as anything else. Some of our men go so far as to say you cannot stir the curd too dry when it is dipped or when the whey is drawn off. Now, I do not believe that. I believe there are some curds you cannot stir too dry if you stir them for a week, because you cannot get the moisture out of them. And there are some curds that have too much acid in them. If a man is dipping with the right amount of acid he can stir the curd too dry, and the result is that he will get a hard cheese. It is always safer to stir dry than to leave a lot of moisture in the curd. I would prefer dipping the curd with a small acid and do less stirring. I will do anything I can to get rid of a little work, and I can never see the sense of a man allowing a curd to get a big acid in the whey, and then get all his men around, when the sweat will roll off them for fifteen or twenty minutes, trying to stir it dry. My idea is to make the cheese just as easy as you can, and avoid all the needless work possible. If you have trouble in getting the moisture out of the curd, back up on the acids, and you will have no trouble in getting rid of the moisture if you dip with a small amount of acid. If you are using a culture or starter you must stir off the whey a little earlier than if you were not using any culture, because at that particular time the use of a culture develops the acid a little quicker, and you have got to dip it a little sharper. In using a culture in the summer time I would never use more than half of one per cent. I have seen cheese that never had too much acid in any stage of the process. The milk did not have too much; the curd did not have too much when it was dipped; it did not have too much when it was milled, and did not have too much when it was sold. You could not see anything wrong with these cheese when they were ten days or two weeks old, but about the third week you would find them commencing to develop a shortening in the grain or texture. As soon as that maker used less starter he got rid of that. He was using one per cent., and I do not think it is safe to use one per cent. of starter any time during the summer months.

Another question you might discuss some time is that of using a little culture in over-ripe milk. That is one of the questions we have been discussing earnestly in our district meetings in the west. The first man who mentioned that subject, two years ago, we thought was a little bit off in the head, but to-day you will find plenty of men saying they are getting good results from it. Some of our best makers go so far as to say that they make better cheese in using a little culture in over-ripe milk. When you get milk a little over-ripe in the hot weather you get bad flavors, and if the curd is dipped into the sink, you find you can get them to mellow down, and the gases get out of it quicker than if you were not using any culture in the milk. Be careful about it. Some of our best men are working it out all right. We cannot have any better guide to go by than good shrewd men doing good work.

You will probably say I have not told you much about making cheese. I did not intend to, for the simple reason I want you to do that in asking questions, or in telling your side of it, and in that way I think we will get some useful information. I know I will, and that is what I came down here for. I do not know that I came down here to enlighten the wise men of the east, but I came here to get information to carry back to the west. The more I see of the cheese business the more careful I think we should be.

I would like to say, in conclusion, that if our makers select the milk carefully at the whey station, understand the making thoroughly and the use of a pure culture, and study carefully the results of the acid and cooking the curds carefully, and finishing the cheese in a stylish manner, and box them in a neat way, we need have no fear of our cheese. (Applause.)

A Member: I feel that what Mr. Barr has been saying is very wise, and that a great responsibility rests with the man at the weigh-stand. I find that after all the effort that we have made, we still have patrons sending in very poor milk, and the only remedy seems to be to send it back.

A Member: I never before had the success I have had this year with regard to cooking curds. When I was in the west we did not cook as high as we do down here, and after I came down here I found that we had to cook higher in order to get good firm curds. In regard to taking in the milk I think that that is the most disappointing part of the business, and it is sometimes very hard to know just where to draw the line.

Mr. Metcalfe: What percentage of acid do you like to carry on the pure culture?

Mr. Barr: I think 7.5 is the limit. I think you will get a better culture between 6 and 7. I believe 7.5 is the limit to allow the culture to go at any time, and I would rather have between 6.5 and 7. I believe there is a large difference between the making of cultures as there is between the different makers. Some will work nicely at 60°, and you will get others that will not work that low. One of the most helpful things that we have in Western Ontario is that they are getting to know one another better, and in fact at all the district meetings that are held every year they passed a resolution that they will not receive milk from any patron or milk that has been refused or returned by any other factory for being over-ripe or being delivered in rusty or unclean cans. (Great applause.)

The Ingersoll section was the first section in Canada to adopt that resolution, and they are shoulder to shoulder for that. In the spring of the year one maker came to me and said that a maker near him was taking some of his patrons, and I said, "If he is, it is a surprise to me, for that fellow is all right." When the matter got sifted down it turned out that this patron could not get a hauler, and he went over to the other factory and got them to send a waggon. When the man who made the complaint understood it, he said, "That is all right; there is nothing wrong there." And that same man who was complained about had a man come to him with milk, and he said, "My milk is not good enough for the other fellow, and I want you to take it." He said to that patron, "If it is not good enough for that other fellow, it is not good enough for me. You can take it back." (Applause.) This is the kind of men we want in the dairy business, and I am glad to say that we are getting more of them in Western Ontario, and I believe that every man who votes for this resolution is in honor bound to stick to it. We have had very few who refused to vote for the resolution, and I wish you would do it down here. If a man starts with you in the spring as your patron, you may send home as much milk as you like, for the other fellow will not take it in.

A MEMBER: We have a district meeting in Peterboro for Peterboro County, and that is one of the questions I think we will take up. I think that is a very essential point.

The CHAIRMAN: There is another point that Mr. Barr possibly might have brought up, and that is in taking in tainted milk. You are doing an injustice not only to yourself but to the other fellows who are furnishing good milk, because it takes more of this tainted milk to make a pound of cheese than it does of first class milk, and then, the cheese is not as good after it is made.

A MEMBER: How do you handle milk in the west that you get on Saturdays?

Mr. BARR: A great many of them make it up Saturday night into cheese. We are working a scheme that we borrowed from some eastern man, and that is to rush the milk through till after milling; then, stir it a little while, put on the salt, pile it up and go to bed. Then get up in the morning, and put it through the press, and it takes only a very short time to do it on Sunday morning. A number are making Saturday night's milk into butter.

A MEMBER: Are they making fine cheese on Saturday night?

Mr. BARR: Yes, I have seen some of the finest cheese I ever saw made on Saturday night.

The CHAIRMAN: Provided he cooled that milk down on Saturday night, and then curled up his feet and slipped into bed till four in the morning, and run it off before church time, and then dressed up and went to church, do you think he would do any great damage? Don't you think that would be a good way to handle Saturday night's milk?

Mr. BARR: One of the things that is puzzling our makers on Saturday night is to see that it is cooled. They put it in the first thing when the milk is delivered, and it helps them wonderfully in getting through it early Saturday night. One thing we noticed is that the patrons will not make any kick if Saturday night's cheese are not always up to the mark. They are recognizing that it is not always the best thing to do. They will not hold the makers responsible for the quality of Saturday night's cheese.

Mr. WHEATON: How about making butter?

Mr. BARR: That is all right where they have a butter plant. They make butter Saturday night for the patrons to use during the week; for the patrons take nearly all the butter and use it during the week.

The CHAIRMAN: We had twenty-six instructors in Eastern Ontario this summer, and I must say we never had as much work done nor as good a quality of cheese made. The boys visited a number of farmers, attended the factory meetings, and they have been up to date this year. Most of them have done everything they could to make things better ever since. Mr. Publow, our Chief Instructor, is working overtime. You would see him away in the west one day, and the next day down in Glengarry. He has prepared a report, and it probably will be the most valuable statements we have had in connection with our system.

REPORT OF DAIRY INSTRUCTION IN EASTERN ONTARIO.

By G. G. Publow, Chief Dairy Instructor, Kingston.

I take pleasure in presenting my third annual report, as chief of the Dairy Instructors for Eastern Ontario. The work of instruction was conducted along the same lines as that of last year. A circular letter was issued, setting forth the object of instruction, and this together with an application form was sent to all the factory managers, from whom in response some 650 applications were received. This was an increase in number over that of last year and made it necessary to arrange the factories into 26 groups. All of the staff of instructors employed in 1904 were re-engaged except Messrs. Morton, Hall, Coad, and Ireland, who had accepted other positions. Mr. Thos. Thompson, a former instructor, was engaged to fill the vacancy made by Mr. Morton, Mr. Warren Dool took the place of Mr. Ireland, and on the recommendation of the people of Lancaster, Mr. E. Wilkinson was engaged to take the place of Mr. Coad, while the new group formed at Chesterville was placed under the charge of Mr. L. A. Zufelt, who was also a former instructor, and Mr. D. J. Cameron took the place of Mr. Hall.

The men were engaged at a salary of $800 for six months' work, and pay their own expenses, a stipulation being made that they were to attend ten annual factory meetings in their group if required.

Before entering upon their duties they took a ten days' course of instruction at the Kingston Dairy School, where special lectures were given by the staff of the school, bearing directly on their work. Besides this, a great deal of time was devoted to practical work in the testing of milk, the making and propagation of starters from pure cultures, and the making and judging of cheese, so that uniform methods would be adopted throughout the different groups.

In order to simplify the manner of reporting on the work done by each instructor, I have prepared a tabulated form which shows in a concise way what has been accomplished in each syndicate.

The factories under inspection in each syndicate are as follows:

Alexandria Syndicate: A. McDonell, Instructor.

Union.
General Roberts.
Dornie.
Dominionville.
Apple Hill No. 2.
Aberdeen.
Maple Leaf.
Victoria No. 1.
Lochinvar.
H. Brunette.
Central.
Highland Chief.
Fairview.
Greenfield Union.
Lorne.
A 155.
Beaver Creek.
Victoria No. 2.
Maple Leaf No. 7.
Glengarry.
Western Star.
Heather Bloom.
Apple Hill No. 1.
Glen Robertson.
Dalkeith.
S 215.
Glen Andrew.
King.

Almonte Syndicate: W. J. Ragsdale, Instructor.

Old Fairfield.
Mississippi Pride.
Rosebank.
Maple Valley.
Rideau Queen.
Irish Creek.
Montague Centre.
Valley Queen.
Rideau Valley.
Rosedale.
Pakenham.
Elmdale.
Roseville.
Mayberry.
Rockspring.
Island Queen.
Lone Star.
Appleton.
Maple Leaf.
Huntley.
Orchard Valley.
Glen Elm.
Ashton Union.

Bancroft Syndicate: James Irwin, Instructor.

McClure.
Bangor.
Bronson.
Beechmont.
Chandos.
Mayo and Raglan.
Greenview.
Combermere.
Walkerville.
Lake View.
Ormsby.
The Ridge.
Hybla.
Fraser Creek.
Deer Lake.
Faraday.
Mayo and Carlow.

Belleville Syndicate: Hugh Howey, Instructor.

Sidney Town Hall.
Halloway.
Bronk.
Shannonville.
Thurlow.
Frankford.
Cedar Creek.
Colborne.
Albert.
Sidney.
Zion.
Union.
Melrose.
Bayside.
Rogers.
Edville.
Wicklow.
Foxboro.
Eclipse.
Silver Springs.
Ketcheson.
Mountain.
King.
Wooler.
Salem.
York.
Brighton.

Brockville East Syndicate: A. H. Wilson, Instructor.

Union Valley .
Barlow.
Elbe.
Leeds County.
Stanley.
Union.
Algonquin.
North Star.
Green Bush.
Palace.
Oak Leaf.
Glen Buell.
Star.
North Augusta.
Miller No. 2.
Mount Zion.
Farmers' Choice.
Farmersville.
Aberdeen.
Maple Grange.
Leeds Union.
Lillie Springs.
Willow.

Brockville North Syndicate: P. Nolan, Instructor.

Dominion.
Rockdale.
Cold Glen.
Centreville.
Reliable.
Farmers' Friend.
Forfar.
Farmers' Pride.
Elgin Model.
Morton.
Gilt Edge.
Portland.
Salem.
Black Lake.
Crosby.
Lake Opinicon.
Maple Grove.
Ideal Canada.
Plum Hollow.
Newbliss.
Island City No. 1.
Smith's Valley.
Green's No. 972.

Brockville West Syndicate: S. S. Cheetham, Instructor.

Wilson's No. 1.
Howe Island.
Pine Grove.
Taylorville.
Marble Rock.
Rockport.
Caintown.
Long Point.
Granite Hill.
Thousand Island.
Central.
Gananoque Jct.
Lorne
Springfield Union.
Lansdowne.
Jackson.
Morning Star.
Anglin.
Springfield.
Gananoque.
Cold Brook.
Junetown.
Sand Bay.
Lilly.

Campbellford Syndicate: R. T. Gray, Instructor.

Empire.
Seymour West.
Crow Bay.
Ryleston.
Victorian.
New Model.
Norham.
Codrington.
Fenella.
Trent Valley.
I. X. L.
Prince of Wales.
Stanwood.
Round Lake.
Beaver.
Morganstown.
Forest.
Roseneath.
Kimberly.
Woodlands.
Brae.
Star.
Trent Bridge.
Percy.
New Evergreen.
Burnley.
Dartford.

CHESTERVILLE SYNDICATE: L. A. Zufelt, Instructor.

McLean's No. 1.
Ault's No. 1.
Ault's No. 4.
White Globe No. 1.
White Globe No. 4.
Loraine.
Inkermann.
Fairbanks.
McLean's No. 2.
Ault's No. 2.
Ault's No. 5.
White Globe No. 2
White Globe No. 5.
Morewood.
Osgoode Centre.
North Branch.
McLean's No. 3.
Ault's No. 3.
Ault's No. 6.
White Globe No. 3.
Grantley.
Sunnyside.
Belmont.

CORNWALL SYNDICATE: J. Buro, Instructor.

Farmers' Lee.
Cornwall Gems.
Dixon.
Glen Donald.
North Branch.
Lunenburg.
Farmers' Joy No. 1.
Moulinette.
Farmers' Choice.
Sweet Briar.
King's Bush.
Glen Walter.
May Flower.
Farmers' Joy No. 3.
Black River.
Lake View.
May's Fancy.
McMillan's Corners.
Cornwall Centre.
River Bank.
Sandringham.

KEMPTVILLE SYNDICATE: D. M. Wilson, Instructor.

Oxford Mills.
Kemptville No. 1.
Scott's.
South Gower.
Suffel.
North Rideau.
Malakoff.
Carsonby.
Chesterville.
Patterson's Corners.
Kemptville No. 2.
Groveton.
Mountain No. 1.
Gordon Model.
Graham.
Goodstown.
North Gower.
Farmers' Union.
Green Valley.
Hyndman.
Vancamp.
Dawson.
Oxford Station.
Twin Elm.
Francis No. 1.

KINGSTON SYNDICATE: G. H. Robinson, Instructor.

Cataraqui.
Cold Springs.
Gilt Edge.
Model.
Keenan & Sons.
Arrigan.
Reynold's No. 3.
Hartington.
Perth Road.
Glenvale.
Ontario.
St. Lawrence.
Rose Hill.
Excelsior.
Reynold's No. 2.
Reynold's No. 1.
Railton No. 1.
Pine Hill.
Wolfe Island.
Sunbury.
Corn Flower.
Battersea.
Glendower.
H. B.
Railton No. 2.

LANCASTER SYNDICATE: E. Wilkinson, Instructor.

King's Road.
Royal.
Victoria.
McDonald's Fancy.
Glendale No. 2.
Bridge End.
McLaughlin's.
Gems of Charlottenburg.
McGillivary's Bridge.
Star No. 1.
Bainsville.
Glen Gordon.
St. Raphael's.
Banner No. 2.
Glendale No. 1.
Farmers' Pride.
Pine Hill.
Banner No. 1.
Glen Roy.
Picnic Grove.
Glengarry Creams.
Glen Norman.
Glen Nevis.

LINDSAY SYNDICATE: D. J. Cameron, Instructor.

Perryton.
Omemee.
Buckhorn.
Palestine.
Dunsford.
Pine Grove.
Ballydoff.
Red Rock.
Fraserville.
East Emily.
North Harvey.
Cambray.
Maple Leaf.
Janetville.
Reaboro.
North Verulam.
Mount Pleasant.
Myrtle.
Bobcaygeon.
North Ops.
Star.
Fleetwood.
Mariposa.

Madoc Syndicate: T. Thompson, Instructor.

Alexandra.
Queensboro.
White Lake.
Roblin.
Madoc.
Moira Valley.
Flinton.
Bogart.
Stoco.
Otter Creek.
Brook Valley.
Beulah.
Victoria.
Premier.
Rock.
Tweed.
Cloyne.
Roslin.
Murphy.
Clare River.
Oak Leaf.
Spring Creek.
Cedar.
Moira.
Plainfield.
Marble Springs.
Boundary.
Thomasburg.
Millbridge.
Eldorado.

Maxville Syndicate: R. A. Rothwell, Instructor.

North Valley.
Goldfield No. 5.
Maple Leaf.
Sunlight No. 1.
Grassland.
Myersville.
R. C. & B. A.
Battle Hill.
Lodi.
Maple Hurst.
Central.
Red Clover.
Canadian Produce.
Cambridge.
Cloverside.
Berwick No. 1.
Baltic Corners.
Finch.
McLean's No. 4.
Crysler No. 15.
Gold Leaf.
St. Albert.
Farmers' Joy.
Strathmore.
Berwick No. 2.
Newington.

Morrisburg Syndicate: C. W. Norval, Instructor.

Matilda West.
Strathcona.
F. F. No. 1.
Model No. 3.
Maple Grove.
Elma.
A. A. L. No. 2.
Edwards No. 4.
Matilda.
McGregor.
F. F. No. 1.
Oak Valley.
Matilda East.
A 19.
Edwards No. 2.
North Williamsburg.
St. Lawrence.
B. C. No. 1.
Model No. 1.
Daisy.
Bouck's Hill.
A. A. L. No. 1.
Edwards No. 3.
Colquhoun.

Napanee Syndicate: Geo. Bensley, Instructor.

Palace Road.
Clare View.
Selby.
Union.
Conway.
Amherst Island.
Marlbank.
Petworth.
Moneymore.
Centreville.
Forest Mills.
Newburg.
Napanee.
Sillsville.
Metzler.
Maple Ridge.
Moscow.
Croyden.
Kingsford.
Camden East.
Deseronto.
Bath.
Odessa.
Bell Rock.
Collins' Bay.

Ottawa Syndicate: W. W. Dool, Instructor.

Jockvale.
Blue Bell.
Gilt Edge.
Perfection No. 1.
Spring Brook.
Pendleton.
C. No. 5.
Stone Brook No. 2.
Century.
Eastman's Springs.
Morning Star.
Sarsfield.
Canada No. 918.
G. 125.
Cobb's Lake.
Ottawa Valley No. 1.
Canada 225.
McGregor No. 1.
Russell Road.
Vars.
Stone Brook No. 1.
Hammond.
G. 604.
Canada.
Green Bank.
No. 238.

Ottawa East Syndicate: J. Villeneuve, Instructor.

Ettyville.
Casselman.
Bolt.
Empire.
C. T. No. 3.
Midnight Sun No. 1.
N. C. No. 2.
G. No. 24.
W. S.
L. No. 1.
Nation River.
O.
A. C.
C. T. No. 1.
Farmers' Fancy No. 1.
Midnight Sun No. 2.
G. No. 144.
St. Adrien.
G. No. 869.
A. No. 35.
S. D. No. 8.
Plantagenet
Empire B.
C. T. No. 2.
Farmers' Fancy No. 2.
Alfred.
Fournier No. 89.
St. Isidore.
G. No. 557.
B. No. 169.

Ottawa West Syndicate: R. Elliot, Instructor.

Bonnechere Valley.
Dirleton.
Edwards.
Glasgow.
Independent.
Maple Hill.
Pine Grove McNab.
Union Pride.
Admaston.
Everett's.
Diamond.
Gold Medal.
Greeley.
Leitrim.
Metcalfe.
Pine Grove.
Woodlawn.
Cold Spring.
Carleton Model.
Equal Rights.
Grattan.
Hazeldean.
Madawaska.
North Osgoode.
Stone Brook No. 3.
Waba.

Perth Syndicate: J. H. Echlin, Instructor.

Bathurst Mutual.
Balderson.
Scotch Line Union.
Drummond & Elmsley.
Mississippi.
Poland.
Maberly.
Tennyson.
Rideau Star.
Dalhousie Lake.
Clayton.
Hopetown.
Drummond Centre.
Middleville.
Parkhill.
Plevna.
Lanark & Drummond.
I. X. L.
Harper's.
Merrickville.
D. & L. Union.
Tayside.
Ferry Road.
Ardoch.

Peterboro' Syndicate: R. W. Ward, Instructor.

Bensfort.
Daisy D.
Melrose Abbey.
Shearer.
Maple Leaf.
Brickley.
North Smith.
Stoney Lake.
Otonabee.
Villiers.
Indian River.
Warren.
South Burleigh.
Apsley.
Lakefield.
Ormond.
Westwood.
Young's Point.
Trevern.
Killarney.
Central Smith.
Keen.
Missing Link.
Oak Leaf.
Shamrock.
Oakdale.
Pine Grove.
Peterboro.
North Dummer.

Picton Syndicate: C. A. Publow, Instructor.

Mountain View.
Allisonville.
Black River.
Cressy.
Union.
Weller's Bay.
Point Traverse.
Bloomfield.
Wampoos.
Glen View.
Ben Gill.
Massassaga.
Elmwood.
Royal Street.
Quinte.
Cloverdale.
Bethel.
Elm Brook.
Union Vale.
Cherry Valley.
Hyland.

Singleton Syndicate: Frank Singleton, Instructor.

Ontario.
Westport.
Mapleton.
Brooke.
Lombardy.
Cobden.
Westmeath.
Model.
Mountain View.
Stanleyville.
Elm Grove.
Prospect.
Osceola.
Greenwood.
Bedford Mills.
Ardmore.
Tay Banks.
Clear Spring.
Golden.
Beachburg.
Rankin.

Stirling Syndicate: J. B. Lowery, Instructor.

Shamrock.
Stirling.
Plum Grove.
Maple Leaf.
Evergreen.
Daisy.
Rose.
Riverside.
North Star.
Hoards.
Enterprise.
Monarch.
Spry.
West Huntingdon.
Cold Spring.
Bell.
Cook's.
Champion.
Central.
Kingston.
Spring Brook.
Harold.
Glen.
Spring Hill.
Deloro.
Marmora.

The tabulated results are given herewith:—

RESULTS OF INSPECTION OF EASTERN ONTARIO SYNDICATES.

Syndicate.	No. of factories in syndicate.	Full days spent in factories.	Call visits given to factories.	Patrons sending milk to factories.	Patrons visited regarding milk supply.	Factory meetings held.	Tests made for adulterations.	Samples with added water.	Samples deficient in butter fat.	Patrons warned.	Patrons fined.	Money received from fines.	Fermentation tests made.	Per cent. of samples tainted.	Factories that have made improvements.	New factories built.	Expenditure on improvements and new buildings.
Alexandria	28	90	150	980	40	2	2,407	2	20	15	5	50	504	10	6	1	3,000
Almonte	23	139	35	1,237	237	1	3,600	6	4	7	....	....	936	70	20	1	7,600
Bancroft	17	110	60	495	60	2	1,115	3	1	2	2	25	65	30	8	......	650
Belleville	27	124	73	2,075	261	1	4.150	6	3	2	5	65	194	50	12	2	7,885
Brockville, East	23	156	160	917	141	3	2,513	6	10	16	....	....	669	75	20	2	9,359
Brockville, North	23	104	87	795	51	......	2,726	4	10	15	....	....	175	35	16	......	1,075
Brockville, West	24	143	90	689	300	3	2,588	12	16	20	2	75	607	30	10	......	2,300
Campbellford	27	143	75	1,056	200	3	3,000	3	....	1	2	25	525	50	5	2	6,500
Chesterville	23	98	95	666	50	6	1,656	....	....	....	....	....	120	75	5	1	2,300
Cornwall	21	123	60	838	100	......	7,063	19	71	60	4	50	70	75	......	1	3,200
Kemptville	25	117	72	1,082	58	1	1,554	1	1	2	....	...	927	49	10	......	1,800
Kingston	25	103	107	882	225	17	1,967	5	12	15	1	25	138	75	20	1	2,150
Lancaster	23	123	57	715	29	......	2,756	2	36	29	7	105	......	......	6	1	1,710
Lindsay	23	115	50	1,485	40	......	3,730	4	1	5	....	....	285	75	......	1	2,200
Madoc	30	125	90	1,116	105	1	2,521	4	5	9	3	60	301	39	10	1	3,700
Maxville	26	135	45	913	307	13	2,878	4	28	32	....	....	397	75	16	3	10,267
Morrisburg	24	138	74	840	154	3	2,520	10	3	3	7	160	850	20	......	1	2,000
Napanee	25	126	75	2,169	69	......	70	3	4	5	2	50	405	50	13	1	3,000
Ottawa	26	136	67	696	14	......	2,596	5	4	9	1	5	113	25	5	1	1,800
Ottawa, East	30	146	65	958	80	6	4,076	16	6	20	2	25	302	60	21	1	2,500
Ottawa, West	26	128	50	1,167	50	1	517	1	4	4	....	....	580	80	16	......	1,868
Perth	24	120	72	1,246	138	12	4,854	1	5	1	6	140	196	75	9	......	3,000
Peterboro	29	117	202	1.572	63	9	417	....	....	....	....	....	269	50	20	......	3,786
Picton	21	107	103	1,758	204	12	4,561	2	1	1	1	20	212	45	16	2	12,800
Singleton	21	113	131	919	133	7	2,457	1	7	8	....	....	314	42	17	1	1,600
Stirling	26	112	106	975	244	1	747	5	1	3	3	60	735	74	16	......	2,400
Total	640	3,191	2,251	28,241	3,356	104	69,039	125	253	284	53	940	9,889	1,334	297	24	100,441

The number of factories that received instruction was 640, and to these 3,191 full day visits were given by the instructors, together with 2,251 calls made at the factories. These call visits are considerably in excess over those of last year, and although inclined to be thought lightly of by some, they result in a great deal of good, for owing to the fact that the cheesemakers have very few opportunities of visiting each other and comparing their work, they are apt to judge themselves by themselves; but the instructor in going from one factory to another is able to note changes more readily, and a call visit simply to look after the cheese is often the means of preventing the maker from getting into difficulties which he otherwise might have if left until the time of a regular visit. They are being greatly appreciated by the makers, who are prompted and stimulated to be more thorough in their work; and besides keeping the instructor in closer touch with them is a strong factor in insuring uniform equality of cheese being made throughout his syndicate.

The total number of patrons supplying milk to these factories was 28,241, and of these 3,356 were personally visited at their farms for the purpose of improving the milk supply. One hundred and four factory meetings were held during the summer with an average attendance of 30, making 3,120 patrons reached in this way, and while there is no doubt as to the benefit derived from these, still, as a rule, when it was found necessary to hold the meetings the patrons were busiest, and their success is not to be compared to the improvement noticed by the direct visiting of the farms, and from which I have known as many as seventeen milk stands to have been moved into more suitable surroundings from one afternoon spent in this work. In some sections many more patrons would have been visited had it not been for the conditions found at the factory, which in some cases were such that the instructors had not moral courage to ask for a better milk supply until the conditions were improved at the place of manufacture. The total number of fermentation tests for locating tainted milk was 9,889, and while 50 per cent. of these were not in a fit condition, still the percentage is smaller than that of previous years, and shows that improvement is being steadily made in the care taken of the milk by the patrons.

The common sources of trouble were over-ripe and gassy milk. Very few complaints were made regarding food flavors, and of these the great majority were due to turnips, and only occurred in one or two sections. During the hot weather of July, a great deal of trouble was experienced in some districts with the sweet curdling of the milk and with bad rancid flavors. These were most marked in the Cornwall and Chesterville groups, and several samples were sent to Dr. Connell for bacteriological examination, the result of which will be given in his report.

When an investigation was made regarding the cause of the deterioration, it was usually found that the trouble was due to lack of cleanliness at the time of milking, or in allowing the milk to remain over night at too high a temperature, together with the improper washing and scalding of the cans and utensils, especially where whey was being returned in the cans. The number of tests for adulteration was 69,039. Of this number 253 showed to have had fat abstracted and 125 to contain added water. Fifty-three of these offenders paid fines to the extent of $940 into the treasury of the factories concerned; two were turned out of the factory, and the rest, at the request of the factory managers, were given a warning. I regret very much that the samples tampered with is greater than last year by 73, showing that even with the high price of cheese which prevailed throughout the season, there are still a certain number of patrons who are not satisfied with what rightly belongs to them, and this would cause us to believe that the morals of the people are not improving in this respect.

This, however, is not so regarding the care of milk at the farms, and I am pleased to report that there is a growing disposition on the part of the patrons to improve their methods of caring for their milk, and a great improvement has been noticed along this line. They receive the instructor in a more friendly manner, and as a rule, are ready and willing to comply with his requests, with the result that a vast number of milk stands have been moved into a purer atmosphere, cleaner milking places have been provided, and much more attention is being given to the cleaning of all utensils with which the milk comes in contact. Perhaps one of the brightest features of the improvements that have been made, and one that is particularly true of some sections, is the rapidly increasing number of patrons who are building up-to-date milk-stands with convenient attachments for cooling the milk rapidly immediately after milking. The improvement in the quality of the cheese made in these sections is just as noticeable, and if the cheese-makers would only be more united and refuse to accept milk in an unfit condition, the improvement would be much more marked in this respect. The patrons are beginning to realize what a difference can be made in both the quantity and quality of the cheese manufactured from milk that has been thus treated, and just as soon as they recognize the financial loss it is to them by not having a supply of ice or cold water, to use during the hot summer weather, the sooner will they make provision for what is one of the greatest necessities of every successful dairyman's farm equipment.

Although the past season did not furnish the most favorable climatic conditions, the quality of the cheese on the whole was much superior to those made in previous years, the early make and the October being of an unusually high standard. During the latter part of the months of June and July there was a sudden onset of a few weeks of very warm and damp weather, with the result that in some sections before the makers realized the conditions surrounding them, there were a great many acidy cheese being made, due in great part to the milk being over-ripe when it reached the factory.

It was at this time that all the instructors accompanied me to Montreal, where they were taken through the wharehouses and allowed to spend three half days examining and comparing the cheese from each section. Besides receiving this profitable and permanent object lesson, the executive of the Montreal Board of Trade went to a great deal of trouble in arranging a special meeting where instructive addresses were given by some of the leading export merchants on the defects found, and what were the requirements of the trade.

The instructors thus had an opportunity of receiving information and advice that they could have received in no other way; and the value of the help it was to them was clearly shown by the reports received on the next shipment of cheese after their return home. Immediately on their return to their respective groups a call visit was made to all of their factories, and meetings of the patrons were held with the object of having the milk arrive at the factory in a sweeter condition. The improvement was quickly noticed in Montreal as shown by the report of the Official Referee, who said he never saw so sudden a change from poor cheese to those of a really high standard, and here I would like to thank Mr. Woodard for sending me a copy of his weekly reports on all cheese he was called upon to examine.

They were of great value to me, and not only kept me in closer touch with the work of the instructors, but gave me a regular weekly knowledge of any defective cheese found in the individual factories, and enabled me to compare the number of rejections from the syndicated factories with those that were not under the supervision of our instructors. While we had about three-fourths of the factories in Eastern Ontario, only about one-fourth of the rejections came from the syndicated factories. Most of the rejected cheese were faulted on account of being acidy, weak and open, or not clean in flavor; and the majority of these came from sections where the factories were small and ill-equipped, where competition was keenest, and where the people were indifferent about improving the sanitary conditions surrounding the manufacture.

While there is no doubt that in many instances the work of the maker showed carelessness or inability, still the origin of the cause of the bad flavored and acidy cheese could invariably be traced to the milk supply; and until some uniform and cleanly methods are adopted in such an industry where so many individuals take part in the manufacture, there will always be more or less trouble with both the quality and the uniformity of the goods manufactured.

There is no doubt also, that in the localities where the factories are the most unsanitary, both in equipment and surroundings, these conditions prevail to the greatest extent, and while education has done a great deal it is quite evident that some good healthy legislation is required to bring about what is beyond the power of persuasion.

But the self-speaking evidence that the manufacturers are showing a disposition to improve along these lines is the amount of money that has been expended on the places of manufacture this year. Twenty-four new factories were built last year, and 297 were repaired, both in building and equipment. These improvements consisted of the building of better curing rooms; providing better drainage and sanitary conditions, in procuring new utensils, in constructing cement floors, and the painting and beautifying of the places in general, giving in all a total estimated expenditure of $100,441.

While all the syndicates have contributed more or less to this expenditure, still, on glancing over the individual reports, it will be seen that a few of the sections have done a great deal more than the others, and it is these sections that are making the most rapid strides in raising the standard of the cheese manufactured in their district.

It was my intention before starting the work in the spring, to have held meetings of the cheesemakers in each syndicate, and, if possible, during the summer try and make a personal visit to all the Syndicated factories myself. The season, however, opened unusually early, and we were only able to arrange for seven meetings before the factories opened.

Meetings were held at Madoc, Peterboro, Picton, Belleville, Kemptville, Smith's Falls and St. Isidore, and were well attended, not only by the makbut by the farmers as well.

The number of Syndicated factories I succeeded in reaching was 520, together with 52 that were not in any of the groups. It is likely that I would have been able to visit all the Syndicated factories had I not been required to spend some fifteen days judging the dairy products at the county exhibitions. However, the majority of the factories that I failed to see I have seen at some previous time. It is quite possible, too, that more good resulted from visiting the exhibitions than if the time had been spent at the factories, for splendid exhibits were made, especially at Brockville, Bancroft, Madoc, Iroquois, Cornwall, and Picton. At nearly all these places there was a good turn-out of the makers, for whom the cheese were bored after the judging was over, and the talk given to them pointing out and explaining the reasons for the awards being placed as they were. At these places good prizes were offered, and the cheese exhibit was one of the main features of the fair, the cheese being of an unusually high standard and of a remarkable uniformity.

Some of the instructors have had acidimeters placed in all their factories, and regularly supply their makers with pure culture starters, and perhaps nothing has been so instrumental in bringing about uniformity as these two things. In skilful hands these starters are invaluable, and where properly used are of great help to the makers, especially in overcoming undesirable taints in the milk and in producing a uniform flavor in his cheese from day to day. In some sections, however, they could not be generally adopted, owing either to lack of skill on the part of the maker or to unfavorable conditions surounding the propagation.

In my personal visits to the factories I found that most of the makers were keeping their factories in a cleaner condition than formerly, and more attention was being given to the finish of the cheese, and everything went to show that the visits of the instructors were having a healthful influence.

The instructors reported to me every week, and in comparing their reports with those of the official referee, with few exceptions I found them to be alike. In some of the sections the instructors were handicapped in this respect owing to the cheese being shipped so very green that they did not have a fair opportunity of judging them before they were taken from the factory. This green shipping system is in vogue in many of our poorest factories, and it is due to this that so few complaints are made regarding the quality of their cheese. But it is certain sooner or later to bring injury to the trade, and should be discouraged by everyone in the business.

The instructors have all done good work, and have put forth an honest effort to give the people good service and bring about improvement in their respective Syndicates. While a few complaints were made against them by some of the factorymen, when an investigation was made it was seldom that any blame could be attached to the instructors, and it is difficult to conduct this work in such a manner that some fault will not be found.

Since the factories have been closed the instructors have been present at 110 annual factory meetings, and many more will likely be attended as a good number of the annual meetings have not yet been held. This work, to my mind, is of very great importance, and I look to it as becoming a very strong feature of the work, as it gives the instructors an excellent chance of meeting the people and bringing before them the defects found in their own locality, and gives them sufficient time to make desired improvements before the opening of another season; and no person should be able to give the people more desirable information than the man who is amongst them during the year.

In conclusion, I would say that the past season has given me every reason to feel satisfied with the work, and I would like to express my appreciation to the instructors for their promptness and energy with which they did their work, and for the willingness with which they have responded to any calls made upon them. I would also like to thank the export merchants for the kindness and co-operation shown at all times, and during each of my visits to Montreal; and also to the directors of the Association for the hearty manner in which they responded to everything pertaining to the welfare of the work.

The Chairman: I would like to say that I am delighted with this report. I think that it is the best report that was ever presented to this Convention, and I feel, with Mr. Publow, that the instructors holding meetings with the patrons in their own locality, and getting the cheesemaker or a director of the Association to talk to them was a good idea. I think these meetings are going to help us with the work. I am proud of the 640 factories that were visited by the instructors, and that tried to make a uniform quality of cheese. We had some factories where they thought they knew the whole thing and did not want any instructors, and I want to say they will be rejected. I hope these factories will sink in the mud, and that they will die of dry rot in the next four years. (Applause.) We want everybody in connection with Eastern Ontario to feel that they have a great responsibility in making a uniform quality of cheese, and we want every factory to come under the influence of Mr. Publow. Do not think that we can live by ourselves any more than a church can be run by any one member. We can not live alone; we must work together, and stand together. Every factory must join in and give us their assistance. I will give you every bit of assistance I can to see that the cheese from factories that are not up-to-date are rejected. (Applause.) We want to see everything done that we honestly can do for Eastern Ontario. We ought to do it for patriotism's sake, for the name we can give Canadian cheese in the Old Land. We have the land, we have the water, and we have the climate, and if we can get the people to understand just what to do, then there is nothing to prevent us from making the finest cheese in the world. If you go to the farmers in the proper spirit, talk to the mistress of the house, and get acquainted with the hired girl—(laughter)—you will find out something. You will find out what is going on in the country, and you can do a great deal of good by talking to these people. We want to commence 1906 by having every factory belonging to some syndicate, and every farmer belonging to some factory.

And you must pay for the drawing of the milk. You will find you will have to do it in one way or another. Some farmers like to get something they do not have to pay for; there is an odd one of that kind scattered over the country. If your factory is not the best in the country, make it the best in the locality. The soundest thing you can do is to keep clean and cool.

A Member: I noticed in Mr. Publow's report, that perhaps the most productive source of bad flavor in the milk was due to turnips. We were given to understand yesterday that you could feed Greystone and White turnips in large quantities to cows without any bad flavor or bad results being obtained. I know, in a great many of the factories throughout the country, where they are prevented from feeding turnips altogether the patrons are dissatisfied, especially where the neighboring factory is allowed to feed turnips. Now, I think if it is correct that the Greystone and White turnips may be fed without detriment to the quality of the cheese, it ought to be generally known. But if, on the other hand, they cannot be fed without injury to the quality of the milk, and to the flavor of the cheese, I think some means should be taken to put a stop to the thing altogether. The discourse we had yesterday I consider a great injury, and I would like to have the matter settled.

Mr. Publow: I would like to go on record as saying that "No turnip should be fed to dairy cows." (Applause.) I will admit that a few turnips can be fed if they are fed intelligently, but before they are allowed to be fed we should teach the farmers how to feed them properly, and that would take a long time. You can produce just as cheaply from mangels. In Peterboro' and Campbellford more turnips were fed than in any one of the twenty-six groups put together. If you want to feed roots, feed mangels rather than turnips; cut the turnip out altogether. (Applause.)

The Chairman: We do not want to discuss that question any more. We do not want any turnips fed to a dairy cow. We won't allow it in our section in any way. It is not safe—it is not right—and we can do better business without them, and I say to you, "Don't feed turnips to dairy cows."

DAIRY BACTERIOLOGY.

By W. T. Connell, M.D., Kingston.

For some years I have been addressing the members of the Eastern Ontario Dairymen's Association on subjects relating to the connection between bacteriology and dairying, and my talk to-day will be along the same lines, as I must limit myself to that portion of the great business of dairying of which I have some knowledge. No doubt much of what I am going to say has been said by other speakers here and elsewhere, but it will do no harm to anyone to have the subject restated.

In most of my talks I have endeavored to lay emphasis on the necessity for cleanliness in the handling of milk and its products, and my idea to-day is to continue along the same lines. I was very much pleased to note in Mr. Publow's report the emphasis which he, and through him his instructors. lay on the necessity for proper care of milk in the matter of cooling and cleanliness so as to secure a fine article of cheese of uniform quality. This is further evidenced by the increase in the number of local meetings of factory patrons where the requisite methods of securing good clean milk, together with the value and necessity therefor, are discussed with the producers of the milk. I believe Mr. Publow is on the right track in developing this side of his work and that he will find it equally as valuable as the assistance given to the makers themselves.

From my special point of view I want to explain why cleanliness is desirable in the handling of milk and its products.

I may state at once that cleanliness is purely a comparative term in the case of milk, just as it is in regard to the care of the body, cleanliness of houses, streets, etc. Just to illustrate this, suppose any one of us were stricken down say with appendicitis and the surgeon decided that it was necessary to operate upon us. Before operating on any individual, no matter if such individual had been in the habit of taking six baths a day, that surgeon would scrub and disinfect, wash, and purify the skin over the site of his incison in a manner more thorough and precise than any laid down even in the Mosaical code. He would treat his own hands, instruments, and dressings for the wound in a similar manner; yet ordinarily all these might be considered thoroughly clean. In the ordinary course of things cleanliness is of the things visible, but the surgeon, and I might say the bacteriologist, has to take into consideration the things invisible to the ordinary eye but none the less real, notwithstanding. For by such attention to cleanliness the surgeon has gotten rid of the curse of the old surgeons, viz., bacterial infection of his wounds, and so is able to perform operations that were not dreamed of by the older operators, or if dreamed of were placed utterly beyond practical realization by their marked fatality. I will come again later on to another application of this illustration.

Commonly we consider cleanliness to mean freedom from dirt and dust. Now what is dirt? The term is widely used to cover such things as spots and stains, earth, soil, grime, and dust. But ordinarily we do not use the term as applying to fresh clean earth, to sand, to gravel, or if we do use it we may say such are clean dirt. We do apply the term more particularly to such objects or materials as are more or less foul, slimy or filthy. The word dirt comes from an older word, "drit," meaning dung, excrement, or filth of some sort or objects more or less contaminated with these.

"Dust" in the same way is simply powdered particles so light as to float or be blown about in the air, and such particles may be either clean or dirty, according to their source. A clean dust would be such as pollen of grains and grasses, etc., while dust coming from decayed food, manure, or other foul source would practically be simply powdered dirt or drit, thus placing dust and dirt in the same category. But what is it that makes this dirt of importance? It is not the clean particles of sand or clay, etc., which are in themselves dead or inert, but it is that such particles are very much alive in most cases with minute forms of life—life so minute as to be quite beyond all ordinary range of vision, but visible by the use of powerful microscopes. Such life is the germ life, bacteria or microbes. Clean dirt will harbor only such forms are are normal to all soils, etc., but true dirt harbors as well those of the dung or excrement which makes such material dirty. Now it is owing to the presence of such bacteria of dung or manure or decaying matter that dirt of any kind becomes of great importance to us. For if such bacteria be transferred to suitable food and if temperature conditions be proper, these are capable of rapid and almost indefinite growth and multiplication. In other words, the dirt simply carries in the seed and if the conditions are favorable a harvest is certain. Now milk, and to a lesser extent butter and cheese, are good food materials for the development of many bacterial species, so that should any of these forms gain entry and the temperature be favorable, it is but a matter of time till the harvest becomes manifest. Naturally the character of the harvest will depend on the seed planted, and the condition with which the "crop" has to contend in developing.

That dirt, true dirt, does get into milk very commonly is a matter of common knowledge. If of the contrary opinion, all one has to do to convince ourself is to go to the weigh doors of most of our factories and watch the milk which comes in, noting especially the bottoms of the cans if the milk has had even a few minutes to settle. There will be no difficulty in at least a small percentage of cans in detecting readily recognizable particles of manure, hairs and straw, and in warm weather flies and other insects. Milk, though a white fluid, is so opaque by reason of its suspended fat droplets that it covers up much even of gross contamination as any one can readily find out for himself by making such a test. Yet gross contamination is frequent. How much more common must contamination be, by minute particles which are more readily covered up in the milk, or are too small to be seen by the unaided eye? Simply because a milk can does not show gross contamination constitutes no reason for believing that milking has been cleanly done, or that milk has been kept in a clean place, as a good strainer ought to remove all readily visible dirt particles; and people may be very dirty milkers and yet send milk that looks quite clean. I am quite willing to admit that a patron who takes care to thoroughly strain his milk will be much more likely to take care in milking and in looking after his milk.

There can be no doubt that of all the dangerous forms of dirt in so far as cheese manufacture is concerned, manure and manurial dust stand readily first. For manure, which is in reality the undigested and undigestible food remnants mixed with certain excretions of the animal, is a putrescent and putrescible mass. The putrefactive changes which are going on therein are due to bacterial growth and action, and an examination of even the minutest particle of such shows it to be teeming with bacterial life. Naturally if such bacteria get into milk, they tend to develop and endeavor to bring about putrefactive changes in it. Fortunately the common souring bacteria—the lactic acid bacilli—which are very seldom absent, exert a marked controlling influence over the development of these putrefactive bacteria, and explains why it is that though manure particles frequently get into milk, yet we do not have in the majority of cases serious consequences following. Still to the bacteria present in manure we can ascribe the origin and causation of most gassy and off-flavored milks, "cowy" flavors, pinhole and gassy curds, off-flavored and even rancid cheese. Of course manure itself may not be direct cause, as the same class of bacteria are common on the hairs of animals, in stable and barnyard dust, and in road dust. I would like to again call attention to the fact that road dust is not simply sand, clay, or limestone, but always carries with it more or less of animal excrement.

Last summer (1905) Mr. Publow sent me a number of samples of "rancid" cheese in which I found present large numbers of a bacillus resembling *Bacillus lactis ærogenes*, which bacterium is quite often found in the manure of cattle. This bacillus has the faculty of producing acidity and souring of milk as well as that of developing more or less gas and foul flavor. Owing to its acid-producing power it is able to a ceratin extent to grow along with common souring bacteria, especially if these be not so numerous as usual and at times may gain the upper hand. Mr. Zufelt, the instructor in the district from which the samples came, sent me a set of milk samples from the various patrons of the affected factory, and this bacterium was found in 20 out of 26, being present in such numbers as to be readily detected in each drop of milk and being quite as numerous as the lactic acid bacilli. It was evident that this bacterium had practically gained the ascendancy in this factory over the desirable species of bacteria, and while I have no doubt that it was primarily derived from some one or more patrons' milk being at some time heavily seeded with it, the trouble was kept alive through the whey which the farmers took back in their cans, and which were not so thoroughly cleaned as to remove all whey traces. The factory, too, I understand, was not in the best sanitary condition, and the whey tank had never been cleaned out until the trouble began, so that it was a case of nearly everyone being at fault.

A number of samples of sweet curdled milk were sent me during the summer of 1905. All of these samples showed more or less viscidity or sliminess. A number of different bacteria were separated from these samples. all of which posessed the property of sweet curdling to a certain extent. They produced this change largely through their developing a rennet like ferment, but also by possessing more or less digestive power on the casein of the milk. The most common form met with was a bacillus which is often found in hay dust and on certain vegetables and frequently, too, in stagnant pools containing much decaying life. It was not possible for me to say what was the source in each particular instance, but the stagnant pools are probably the commonest source of infection in summer, the water getting on the udders and the dried scum then falling into the milk-pail. In winter and fall the source would most likely be hay and stable dust. This bacillus when introduced into fresh milk and kept at ordinary room heat after 24 hours makes the milk thick and very stringy. At warmer temperatures it thickens the milk much more quickly, but the milk seldom shows much stringiness, but is more viscid. In all these samples the souring bacteria were either absent or present only in small numbers, and when the souring bacteria are present as a rule they rapidly check and prevent the development of the other bacteria, though not necessarily so. Most of the bacteria I have investigated that produce this sweet curdling are spore-bearing bacilli and such forms are much harder to permanently get rid of than are non-spore forming species.

It will be noted that when the evil forms of bacteria get in and develop it is usually when the desirable bacterial forms, viz., the souring or acid producing species are absent or are prevented from developing by the evil forms securing the upper hand. The moral simply is that these evil forms must be kept out as much as possible by keeping out dirt. We cannot hope to be so clean as to keep out bacteria. Even the surgeon, where he has every opportunity to choose his subject and time, does not always so succeed. Much less so can dairymen expect to. But by exercising care the extent of infection through dirt can be greatly lessened, and by control of the temperature the development of those bacterial forms which get in on dirt, can be checked. The necessity of milk being properly cooled during the warm weather has always been insisted on by Mr. Publow and his instructors. Bacteria require heat to develop, just as do other plants. We find in practice that growth is slight at temperatures below 65° F., and milk should be cooled to this during warm weather. A look at this table will show you the effects of cooling milk and keeping it cool as contrasted with milk at high temperatures.

Another point to be kept in mind is this, that in comparison to the evil of undesirable bacterial forms that low temperatures such as between 60° and 68° hinder the growth of the common souring bacteria less than it does these forms.

In Mr. Publow's report I notice that the factories of Eastern Ontario have been improved at a cost of over $100,000 during the past year. This is a matter of sincere congratulation to all concerned, and will be a hint to all who have not so far joined in the forward movement to do so. For there is still a percentage of factories whose surroundings cannot be considered as sanitary. There are too many poor make-room floors, too much polluted water, too many foul pools of whey and drain matter, too many foul tanks yet in this country. Too many factories still swarm with flies in warm weather, and one may be certain that where flies abound the conditions which breed flies must abound, and these, as everyone knows, are "dirt" or putrefying matter. No maker whose factory and surroundings are not in good condition has any right to call down a patron for bringing him poor or dirty milk. Let the maker set the example, for he is the man who is supposed to know the condition under which cheese should be made, and if he preach one thing and practice another it will be his practice that will be followed, not his precept.

This summer I have met again with samples of rusty discoloration of cheese. This is the first authentic set of samples from Eastern Ontario I have received since I detected this condition in a factory in Leeds county in 1896. From Mr. Publow's description of the condition of the factory where the rusty cheese was made, I note that the conditions of the factories were quite similar. I will read you the condition of the factory in Leeds county, and I will ask Mr. Publow to describe what he found at the affected factory this summer:

"The factory was pleasantly situated near the bottom of a small valley and close to a main travelled road. Within twenty-five feet was a small running stream which would afford excellent removal of drainage. The drain, however, leading from the factory, was in a very defective and filthy condition. The drain or gutter was a small, open, wooden one, very defective at several points; most of the sides were missing close up to the factory. This drain passed under the factory floor, but did not communicate directly with the gutter in the floor of the factory; but the drainage from above had a fall of about eighteen inches into it, allowing splashing all around. This drain passed under a roadbed about four feet out from the factory, and then ran to the bank of the small stream (not directly into it). Now, at two points of its course in particular, viz., close up to and under the factory, and at its termination on the bank of the stream, there was found on the sides of the drain and the surrounding soaked and splashed earth, a slimy mass varying in colour through reddish, reddish-yellow to reddish-gray; and in places reaching a depth of three-quarters of an inch. This slimy mass gradually faded off into the surrounding dust. Let me add that the drain made its exit just beneath the weigh doors of the factory.

"The factory floors and some of the furnishings were rather untidy. The vats and tin utensils looked clean. The curing room was well kept."

It is evident that the time has come for the closing up or rebuilding of factories in such a condition as this.

To make and to continue to make first-class cheese, not only must the makers be competent, but the milk must be clean and properly cared for, and the factories must be in a thoroughly sanitary condition. Cleanliness is godliness in cheese-making.

Mr. James Whitton: I did not happen to be in yesterday, and I do not know who it was backed up this turnip question. I would like to see what sort of a looking man he was that would back up something that is detrimental to the cheese industry of this Province. I live in the Peterborough and Campbellford district, and I am sorry to say they are pointed out as the two worst districts for persisting in putting something into the milk that the cheesemaker cannot take out. Part of Peterborough was settled with Scotch people, and they say that you can hardly separate a Scotchman and a turnip, as they were brought up together. I believe a Scotchman likes the flavor of a turnip, but I can tell you that the cheese buyer does not like turnipy flavor in the cheese. Forty-five points out of the possible one hundred is allowed for flavor, and the farmer cannot expect to get fancy prices if they will persist in feeding turnips. In this district, up to the 1st of September, there is no finer cheese made in Canada; but after the first of September the trouble begins, and that is when we should be making our finest cheese. If you say to these farmers that if they feed turnips properly they will have no trouble, that is letting in the thin edge of the wedge. Cheesemakers should say to them that they won't be responsible for one pound of cheese made where turnips are fed. If we allow the patrons to feed turnips we are going to lose our reputation.

Mr. Payne: We have farmers who think it is a clever thing to get a lot of turnipy milk past the cheese maker. It is hard to watch everything and take samples of milk, and weigh the milk and detect all the bad odors, and I think the only thing to do is to make the farmer pay the bill if he will persist in feeding turnips.

A Member: The majority of patrons in our factories are good men and are willing to do what is right, and I have found one of the most successful things to prevent feeding turnips is to have the patrons pass a resolution at the factory meeting making any one man in that factory responsible for the whole output if he feeds turnips. That is if the cheese is cut down $100 make him pay the whole $100.

The CHAIRMAN: That is a Christian view to take of it. (Laughter.)

Mr. SINGLETON: I think it is of the utmost importance that no uncertain sound should go out. It seems to me this turnip question was settled years ago. Mr. Barr, this morning, in his address made somewhat of a distinction between the old time starter and a culture. I would like to know whether this Convention, or whether the cheese instructors of this Convention, have the thought in their mind of cutting the term "starter" out. In some sections pure culture has been discontinued from the fact that it was so closely related to the results of the old time starter. I am of the opinion that there has been an incalculable damage done by the improper use of what we call the old starter, and I think it would be well for the instructors to bury the term "old starter" and use the term "pure culture." Another point. I noticed our President this morning, and we think we have the most up-to-date President in Canada. (Applause.) But I want to give him a little advice. He used the term, "acidy milk," and I do not think that is a proper term. I believe from the experience I have had on a farm for some years that there is a good deal of milk comes to the factory that ought to be rejected, and this is caused by the undue use of the aerator in improper localities. My attention was called to this point a few days ago. One of our patrons had a few cans returned in the summer, and he outlined to me what he had done, and I came to the conclusion that he had spoilt the milk by aerating it. I think the instructors should make no uncertain sound on that point. I have been telling my patrons not to aerate it at all. To cool it down immediately and to have the surroundings clean and cover the milk up. The Chief Instructor brings his instructors under supervision for ten days in the year so that they will go out with one idea and preach that one idea to all the patrons. I am greatly pleased with the report of our chief instructor. In passing through the country I came in contact with the producers, and I was delighted with the atendance at sixteen of my annual meetings, and I have no hesitation in saying that we must have the instructors. We could not do without them, and I am pleased to see that they are making such a favorable impression.

Mr. PUBLOW: I am delighted that we have our good friend, Mr. Barr, with us. This is cheese makers' day, and we want to make the very best of this meeting. Mr. Barr is chuckfull of information. They had a cheese score perfection last winter at their Convention, and we would like to know those fellows make this perfect cheese. We are not a bit jealous of them. We want them to do their best, and we want to keep in touch with them. Two things Mr. Barr sent home this morning, and I would like to help to send them home further with trip hammer force, if I could, and that is to get the makers to have an ideal, not only in making cheese, but in receiving the milk. We all know that we cannot make cheese any better than the raw material, and the man who produces the milk is the greatest factor in the making of cheese. I hope to see the day when the farmers will use the cheese factories as dairy schools, and where they will meet and ask the cheesemaker how things are working, and if the milk is working to his satisfaction? If the milk is not right, you cannot make good cheese. In some sections this year the Cheese Boards passed resolutions that unless patrons of factories kept their milk in a certain place, and gave it certain care, they could not sell their cheese on the Board, and that had a very marked effect. We would like all the cheesemakers to stand for what is right. There is not much good in an instructor going to a cheese factory and saying, "This can is rusty and you should not send your milk in that kind of a can," or "You should not leave your milk in that kind of a place," unless you carry out the instruction he gives. There are two things that require your attention in this eastern section to raise the standard of our cheese. Fully 90 per cent. of the makers are doing their work very well; but the milk comes over-ripe, and not clean in flavor. If all the milk in Eastern Ontario was delivered at the factories as good as the best, that is clean and cool, it would take at least half a pound less milk to make a pound of cheese, and the quality would be very much improved. (Applause.) And if all the curing rooms in Eastern Ontario were as good as the best, there would be a saving of at least one pound on every cheese made in Eastern Ontario, and that would go into the pockets of the farmers, and the quality would be better, and it would stimulate a greater consumption and bring better prices. A great many people say we pay the cheesemaker to work the gas out of the milk, and they really believe it.

The Chairman read invitations from the Canada General Electric Company, the American Cereal Company, the Cordage Works, and other factories situated in Peterboro extending to the members of the Convention a hearty invitation to inspect their works.

CHEESE OR BUTTER?

By Prof. H. H. Dean, O.A.C., Guelph.

My subject is: "A comparison of cheese-making and butter-making chiefly from the farmer's view point," and to some extent from the manufacturers and makers' view point. Comparisons are said to be "odorous." That is the way I put it in an article I sent to the agricultural papers; and I notice that every one of the papers changed that to "odious," and I have since wondered if there was no sense of humor in the average agricultural editor.

It will probably do us no harm to compare these two chief branches of dairy in this great Province of Ontario. Here in this section you are engaged chiefly in cheese-making that is the most important branch of the dairy business right here. Some of the Americans ask us "How is it that in Canada you have developed cheese-making to such a large extent, and you are making such a small amount of butter." When the smallest of the Wilson triplets was asked regarding his size, he said: "Maw could only raise two of us, so dad had to raise me." Now the butter end of the business in this country has evidently been in dad's care, and has not received that attention and careful thought and that working out of the problems in connection with butter-making that our cheese-making has received. My judgment is that in this Province of Ontario in the near future a change will take place in the relative position of cheese-making and butter-making. Instead of exporting the large amount of cheese which we do and the relatively small amount of butter, we shall see this position reversed, and I hope I will be able to point out to you why I think this will be the case.

First, let us compare them in their points of similarity. In both we must have good cows. In your meeting yesterday this question was thoroughly discussed. They are at the foundation of successful cheese or butter-making, and it will do no harm if we briefly call attention to two or three points in that connection. A man who is in any branch of the dairy business will have a hard time to make money out of his cows if he has poor ones. Let me give you an illustration from our own herd. In the month of December we bought two cows, and one of these cows gave us in sixteen days 991 pounds of milk which contained 44 pounds of butter. In calculating the butter we add 1-6 to the fat. The profit on the butter, allowing the cow the same price as we paid farmers in the month of December for fat, 23 cents, the profit was $4.60 over the cost of feed. As the most of the milk which we produce from our cows is sold at 4 cents per quart, the profit on the milk at 4 cents over the cost of the feed was $11.75. That was in sixteen days, which is a little over half a month. The feed for that time cost about $4. We bought another cow the latter part of November, and we began milking her the 2nd of December and she milked for thirty days, and gave in that time 847 pounds of milk, making 43 1-2 pounds of butter. Although she gave less milk than the other cow, her milk was richer, and in thirty days she made us 43 1-2 and the other made 44 pounds in sixteen days. The cost of the feed for thirty days was $4.28. She gave us a profit of $4.30 on the butter, and $9.25 on the milk.

Some of the breeders of pure-bred stock, as you will notice, have been criticising us very severely because we have not better cows of their breed in our stables. The position which I take on this question, and in which I have the support of the Minister of Agriculture and the President of the College, is that men who are breeding pure-bred dairy stock and who wish to sell them to us must be able to say to us that this cow that we are offering you has an official record, made by an independent person, of so and so. And unless this cow has an official record made by an independent person, and a record that is satisfactory to us, we shall not purchase any more pure-bred dairy stock or pay fancy prices for form or color. That is the position I take at the present time.

The Minister of Agriculture for the Dominion is about to make provision that the breeders of pure-bred dairy stock may have their cows officially tested by a competent person at practically no cost, and if breeders of pure-bred dairy stock will not avail themselves of this offer, then I hold that they have themselves to blame if the people of this country refuse to pay fancy prices for fancy forms and fancy colors which have not the power to perform at the back of them. What we need more than anything else is not so much these fancy colors and fancy forms, but, rather, the power to perform, and unless a cow can perform she is of little use to the farmers of this country. We have too much of these fancy points, and it is time we laid emphasis upon the ability to produce milk or butter. We must have good cows whether for cheese-making or butter-making. Second, these cows must be fed on suitable food. Mr. Glendinning, of Manilla, discussed that with you yesterday. Get the best cow that you can find, feed it with suitable food,—all the quantity the cow can assimilate and digest and turn into milk in a profitable manner. We made an experiment last winter during the months of January, February and March, 1905. We took three different groups of cows, and fed one group on four pounds of meal a day and all the roughage they could eat; another group on eight pounds of meal and roots and all the roughage they could eat, and another group twelve pounds of meal and all the roughage they could eat. At the end of four months we changed them about, feeding eight pounds to the group that had received four pounds, twelve pounds to the group that had received eight pounds, and four pounds to the group that had received twelve pounds, and so on. The cows that received four pounds of meal per day gave an average of 23.1 pounds of milk per day, or about 2 1-4 gallons. The cows fed on eight pounds of meal per day gave 25 1-4 pounds of milk per day. The cows fed on twelve pounds of meal per day gave an average of 26 1-4 pounds of milk per day. That was the average for all the groups. They all gave practically the same percentage of fat in the milk whether fed four, eight or twelve pounds of meal. The average for the different groups was 3.56, 3.46 and 3.46. Cost to produce one hundred pounds of milk where four pounds of meal fed a day was 45.4 cents, eight pounds of meal 51.4 cents, an increase of 6 cents, twelve pounds of meal 68.1 cents, an increase of 17 cents per one hundred pounds. The butter side of it: four pounds of meal 11 cents per pound, eight pounds of meal 13 cents, twelve pounds of meal 17 cents. We find that the small amount of meal gave us the most economical return both in cost per one hundred pounds and in cost per pound of butter. You will notice that the average milk flow was considerably lower when we fed a small amount of meal, and that agrees with our practical experience. We find it necessary to give the cows about eight pounds of meal per day in order to have them maintain the milk flow, but we can produce milk very economically with a small amount of meal. Our meal consists of four pounds of bran, three pounds of ground oats, and one pound of oil cake, fed in two feeds a day, and we also feed roughage twice a day, night and morning.

The lesson we learn is this, *"that the cows must be suitably fed in order to produce milk economically."* If we are to get good results from our cows we must give them a liberal amount of feed. There are a great many farmers who are trying to get a large amount of milk from the cows from very little feed.

Next we must have suitable stables for our cows, and the whole question of suitable stable is summed up in this: They must be kept clean, well ventilated and lighted and the cow made as comfortable as possible. I do not care how you get these results, but that is what you aim at, a clean stable, well ventilated and lighted, and one in which the cow is made as comfortable as possible.

We need to take good care of the milk. The proper care of milk is so simple and so much depends upon it, that we wonder why people do not avail themselves of such a simple method of caring for milk. Again we say the whole question can be summed up in two words," keep the milk and cream clean and cool," and you will have a good raw material for the manufacture of either cheese or butter.

Now, as to some points of dissimilarity in the cheese and butter business. Farmers who are patronizing cheese factories in this country may not know that they are robbing the soil of its fertility. Suppose you pay $5,000 for a farm, outside of the buildings and fences what is it that you have bought and that you have paid for with this $5,000? It is the fertility or the plant food in the soil, and every time we send 6,000 pounds of milk to a cheese factory, we are taking away from the farm about $6 worth of soil fertility. On the other hand the man who is making butter fat on the farm, skimming the milk, is taking practically nothing from his farm. As I go about the Province of Ontario, I am more and more convinced of this fact, that our farmers must pay more attention to that question.

Down in the State of Vermont, where I have been for the past few days attending a convention, they have practically given up all cheese-making, and are nearly all butter-makers, because in that hard rocky State, where the rocks come out of the ground, I heard one farmer say he was making his farm by using dynamite to blow up the rocks. And in that State they are going into butter-making in order to keep up the soil fertility.

In the manufacture of cheese we take out of the milk, two parts, and in the manufacture of butter we take out only one. For the manufacture of cheese we use the caseine. For butter-making we take out only one thing. namely, the fat.

In the division of the proceeds the patrons of cheese factories and creameries, we need to proceed on different lines in order to give the farmers the just amount of money which is due to them, and I think it is time we agitated the question of testing milk at our cheese factories and creameries. In some experiments we have made we find milk testing 2.2 per cent. of fat, will produce $9.03 worth of cheese from 1,000 pounds of that milk. Milk testing 4.2 per cent. of fat will make $10.67 worth from 1,000 pounds, an increase of $1.65 on 1,000 pounds of milk, and is it fair that the farmers that are producing milk with 4.2 per cent. of fat shall for every 1,000 pounds of milk they send to the cheese factories of this country put their hands down in their pockets and pay $1.65 to some other man? Are you prepared to go on with that sort of thing from year after year?

A Member: We cannot go on with that sort of thing.

Prof. Dean: I am glad to know that one man is content to have testing. Yet we find farmers and dairymen content to go on in the old way, and pay the same prices for a can of milk whether it comes from a cow or a pump, and as a consequence the instructors and inspectors have to do a certain amount of detective work. I think that getting around a man's straw stack to see whether he is putting water into his milk or not must be one of the meanest kind of jobs.

I remember when my father was running a factory in Brant County his getting up at three o'clock in the morning and going around a straw stack to see whether a certain farmer was watering the milk, and I remember how mean my father felt. And yet the farmers are satisfied to go on in the old way, and pay everybody the same price per one hundred pounds of milk.

I do not think you would continue that sort of thing if you would sit down and think that matter over for five minutes. Pasteurizing is applicable to butter-making, but not to cheese-making. In my judgment pasteurizing of milk or cream for butter-making is one of the most important points in enabling us to make a fine quality of butter, and we shall never be able to compete in the markets of Great Britain with the Danes and Swedes until we adopt pasteurizing.

A Member: You speak of this condition continuing. It might be well to know that this thing is going to continue as long as cheese-makers are continually running down the Babcock test. I have known men to say that the Babcock test was worthless; and if the cheese-makers will tell patrons that I do not see how we are going to change the system.

Prof. Dean: The remedy for that sort of thing has already been foreshadowed. In my judgment, inside of four years no man will be allowed to manufacture cheese in the Province of Ontario unless he can prove to a competent committee of men that he knows how to make cheese and understands the Babcock test.

We have men who are making cheese to-day who are hardly making a living out of it, and that is not fair. In the near future they will be able to command such wages that they will be able to make an honest living, because factories of this country will be large and better equipped, and will be able to pay decent wages for the work. But that will not be until they have demonstrated their ability to manufacture cheese in a first-class manner.

More skill is required in the manufacture of cheese than butter, because we have a more difficult problem to understand. From some experiments we have made this year I am led to believe that in the manufacture of cheese there are two things which we do not sufficiently emphasize at the present time: The first is that the cheese maker must have absolute control of the development of the acid in the cheese, and I was glad to hear Mr. Barr emphasize the points that every cheese-maker should understand the acidimeter. This past summer I had the privilege of seeing a large amount of cheese in the markets of Great Britain, and they said to me: "A great many of your cheese are too bony." Why are Canadian cheese very often too bony? Because the man who made them doesn't know how to control the acid, and the cheese-maker who can make cheese with the smallest amount of acid is the most skilful man. The man who develops 1.2 or 1.3 on his curd does not know how to make a fine cheese. And I believe we will suit the markets of Great Britain better if we develop less acid. I say a cheese-maker needs more skill than a butter-maker.

Another point is the moisture in the cheese. Some cheese-makers, when they dip out the cheese, stir it until they think they have got about the right amount of moisture left in it. We need a quicker way for the cheese-maker to ascertain the moisture at the time of dipping. I think we will discover a reasonably quick method, and a fairly accurate method of determining the percentage of water in the curd at the time the whey is run off.

With reference to butter-making, I have come to this conclusion, that the shorter the times elapses, between the milking of the cow and the manufacture of butter, the better will be the quality of the butter. What we call a ripened cream flavor of the butter is an acquired taste. The true butter flavor is that which is made from sweet cream, churned as soon as possible after the milk comes from the cow, and this so-called ripened cream flavor is something for which we have to develop an unnatural taste, and I put it in the same class as smoking cigars, drinking whiskey, and all those bad habits which the animal man has acquired. (Applause.) The butter which brings the highest price in the market in Great Britain is made from cream with very little acid in it, and I think it is wrong for a butter-maker to develop 5.6 of acid in the cream before churning. I think it would be better to churn the cream directly after separating, pasteurizing, and cooling. We have sent two boxes of such butter to England, and report has been, "Flavor and condition perfect." I think I am safe in saying, Mr. President, that we have been making a mistake in our methods of manufacturing butter. The sooner we can get it made into butter after the milk comes from the cow, the better it will be. A great many of the bad flavors we find in the cream is caused by holding the cream too long.

I suppose all of you are in the business not for the fun of it, but for the money you can make out of it. The milk that will make a pound of butter will make two pounds and a half of cheese. We find that the average price received for creamery butter is 21½ cents. The average price received for a pound of cheese is 10½ cents, an increase of about 5 cents more money for cheese than for an equal amount of milk made into butter. That is direct cash in your pocket; that jingles. The relation is about as one to one and a quarter. But we have another question to consider—the by-products, the cream, butter, milk and the whey. I have estimated that the by-products from the manufacture of creamery butter are worth 5 cents, and from 2½ pounds of cheese just 1 cent. Then for one hundred pounds of milk manufactured into butter alone, allowing 5 cents per pound for the by-products, the farmer would get a $1.10. For every one hundred pounds of milk made into cheese, allowing 1 cent for the by-products, he would receive $1.09. So that when you consider the by-products there is very little difference in the returns, it is only 1 cent. Butter-making has this advantage, that you are able to keep up your soil fertility better than you can by making cheese, and you can raise better stock.

A MEMBER: How do you propose that the farmer will get the products home again?

PROF. DEAN: The milk that is delivered to us at the Dairy School is separated, and for every 100 pounds of whole milk delivered we give the farmer 85 pounds of skimmed milk. He receives a check at the weigh stand, and when he goes to the machine it weighs him out 85 pounds of skimmed milk for every one hundred pounds of whole milk delivered. Before he takes this milk home it is pasteurized, and that is done at no expense whatever, as we use the exhaust steam from our engine, and the skimmed milk is returned to the farmer in good condition. Our own calves are fed out of the same tank.

A MEMBER: Some makers have the habit of sending the milk sour and thick.

Prof. DEAN: That is not right. That milk should be delivered at the creamery and the skimmed milk sent back to the farmer the same day, in the shortest possible time, and in the best possible condition, and if he is not doing that he is not a successful creamery man.

A MEMBER: In this district I do not think there is a creamery drawing milk to the factory. Each patron has to draw his own milk there and draw it back.

The CHAIRMAN: I do not think it is worth a cent to discuss this. I will tell you why. There is no doubt in the world all the people of Eastern Ontario will make cheese, from Toronto to the Ottawa River, solid. (Applause and laughter.)

Prof. DEAN: In my judgment, the time is not very far distant when you will see a change in that.

A MEMBER: The reason the creamery man won't send the skimmed milk back is because the farmers won't pay for it.

Prof. DEAN: If the farmer wants the skimmed milk back he should pay for its return to the farm.

A MEMBER: At what temperature do you heat the cream?

Prof. DEAN: 180° to 185°, and we cool it to 45° or 46°.

A MEMBER: Do you pasteurize during the summer?

Prof. DEAN: Summer and winter.

A MEMBER: Is it a satisfaction to separate the cream at home?

Prof. DEAN: If it is delivered sweet it is all right.

A MEMBER: Would it make any difference what time the meal was fed —before the roughage or after?

Prof. DEAN: I do not think it makes any difference.

A MEMBER: Doesn't it make any difference whether the cream is leathery or not?

Prof. DEAN: Yes, the farmers do not get as good a return if the cream is leathery on the top of the can.

A MEMBER: Can you get a uniform quality of butter from the cream gathering system?

Prof. Dean: You can, and the only way to get it is to have the cream delivered at the factory sweet. At first sight you would say delivering the cream is more profitable, but unless we can improve the quality of our butter and get a bigger price for it the farmer will suffer.

A Member: That is the reason they won't pay for the drawing the milk home, because they don't get sufficient price?

DAIRY NEEDS.

By J. A. Ruddick, Dairy Commissioner, Ottawa.

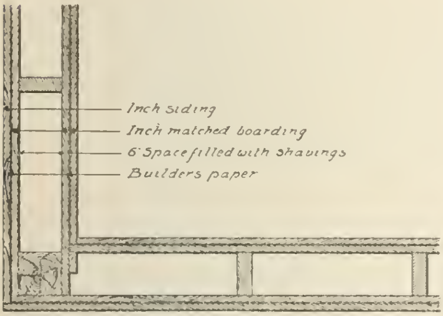
I have listened with very much pleasure to the remarks made by Prof. Dean, and I would like to add one thing, and that is with regard to the plan we are trying to introduce of testing cows in Canada. I think there is no line of work that the owners of factories can give their attention to that will bring them more returns than encouraging their patrons to take up this work. I would like to see every factory in this country made a centre for that kind of work. You have the machinery to carry it out. I believe if the same effort that is now being made to get milk from a neighboring factory was put towards getting patrons to increase the production of their cows, it would be a more lasting and permanent good to the dairy industry. I believe that is one way in which this work can be carried out most economically and usefully. I believe we are at the beginning of a great movement along this line, because anyone who is giving it any attention at all must see that there is great room for improvement.

I am to speak this afternoon on some of the needs of the dairy industry. I propose to take up just one or two points. We have heard a great deal the last two or three years about the need of better dairy buildings. I do not think that anyone has been more earnest in advocating better buildings than I have, because I have seen what other countries have done in this respect, and I am sorry to have to say that as far as my knowledge goes, and I have visited most of the big dairy countries in the world, the average dairy building in this country is the poorest building of the kind in the world; I am sorry to have to say that, but it is absolutely a fact so far as my knowledge goes.

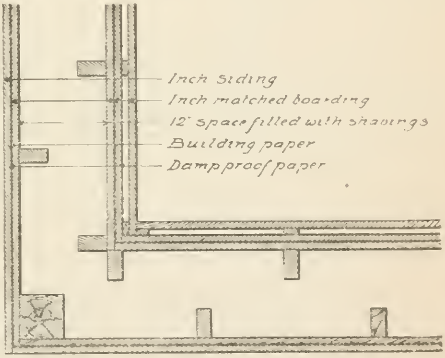
I have given a great deal of attention to this question of improving our dairy buildings, especially along the line of our cheese factory curing rooms, and I want to draw your attention to some recent work we have done.

When we built these curing rooms that have now been in operation for four or five years we had nothing whatever to guide us in the matter, and we had to be sure that we were building them good enough to carry out the object we had in view. After four years' experience we have learned that it is not necessary to put quite so much insulation in the walls, or to go to quite so much expense, and some experiments that we conducted last summer building small chambers of different forms of construction has helped us to come to some conclusion on that point. I am not going to say anything about the cooling and curing of cheese, although I think there is no one question to-day of more importance. It is not a question of introducing any new or artificial conditions. It is simply attempting to cure our cheese under the same condition that exists in September or October, or, on the other hand, the same condition under which the Scotch and English cheese-makers cure their cheese. The temperature there very rarely goes over 65°, and one of the greatest things on this point is some information concerning what is necessary to do in order to improve the existing curing rooms or to build new ones.

I would not recommend you to put in a cement floor and insulated walls unless you have an ice-chamber in connection: for the reason that you would be able to keep the temperature down to about 65°, but such a curing room would be so saturated with moisture that you could not keep the cheese in proper condition. They would mould, and the rind would be very likely to rot. Therefore, I never recommend anyone to go to the expense of putting in a cement floor unless they are prepared to put a small ice-chamber in connection with the curing room, and that ice-chamber should be about 1/3 or 1/4 the size of the curing room. That size has been found to be large enough, providing the wall of the curing room be well insulated. There are many curing rooms in this country where there is plenty of room to put an ice-chamber at one end. It does not make much difference where you have it in the curing room so long as you have it at about the same level, so that the cool air might flow out of this ice-chamber into the cooling room and be returned through the opening in the ceiling in order to have a constant circulation of air. That removes the moisture from the air, and keeps the air in the room sweet and clean, and you will have no difficulty whatever with moisture or bad colors. You do not require to ventilate a cheese-curing room as you would require to ventilate an audience room like this. Doors and windows can be opened when the temperature is lower outside than you require to have it in the curing room. It is my firm conviction that we do not require to reduce the temperature below 55 degrees. That has been our standard for the last two or three years.



Plan of walls for cool cheese curing rooms.



Plan of wall for ice chambers.

The construction consists of siding on the outside, and one layer of matched lumber with paper between. Then a twelve-inch space filled with shavings, and then double boards inside that with one inch air space and single board. That air space is put in there to keep the moisture from the ice-chamber penetrating into the insulation: because insulation is not effective if it becomes damp. The ordinary air space has been abandoned altogether in modern cold storage construction. The shavings that are put in do not make the insulation, but it is the air which is confined by them and cannot circulate which makes it. The air must be confined so that it cannot circulate, and where the space is filled with shavings or other suitable material there is no circulation of air, and we have the best form of insulation that is known to-day. There is no other material as far as I know that gives as good a result, considering the cost, as shavings. Of course shavings are not fire proof. There are materials that will not burn rapidly. Some objection has been made that shavings encourage mice and rats; but if the sheeting is put on as it should be, without any openings being left, there is not much danger of the mice getting into the shavings. The sheeting should be put on very tight without any openings whatever, and mice will not gnaw a hole through an inch board.

Q. What kind of paper do you use?

A. Use good water-proof paper. Any dealer in paper will furnish you what is required. We also put one course of damp-proof paper on the outside, and for the other course we use the best quality of felt paper. Tar paper should not be used in any building where cheese and butter are kept.

Q. Do you fill both spaces with shavings?

A. No, the small space is not filled; that is to prevent the moisture from penetrating into the shavings.

Q. Would sawdust do as well as shavings?

A. No, it would not; sawdust is a poor insulating material. We have made careful tests comparing sawdust with shavings during the last summer, and there is a very great difference, and the particular reason for this is that you cannot get sawdust perfectly dry, the shavings are mostly made from kiln-dried lumber.

We have experimented with different kinds of curing rooms, and we find we can reduce the insulation considerably. The insulation in our present curing room is more than it should be, and we find the temperature is sometimes too low, and last season we went to the extent of heating the curing room during the month of June, and circulating the air over the ice at the same time. It takes very little to heat the temperature 5 or 6 degrees, and we then circulate the air so as to keep the moisture out of the room.

Q. Any covering on the ice?

A. No, the air would not come in contact with it if you covered the ice.

This diagram shows a plan of part of a wall which, I think, will answer for a wall for a curing room, built entirely of wood, and that is what is used mostly in this country. It consists of two courses of lumber outside, and two courses inside the studding, and I think the studding should be 7 inches, and all the better if 8 inches. Leaving a space of 8 inches between the inside and outside, which is filled with shavings. I had a curing room fitted up last fall, and all we did was simply to fill the space between the studs all around, and it gave excellent satisfaction. You do not require any air space for a curing room, because there is not any moisture that will penetrate the insulation there. We use one course of damp proof paper on the outside and one course of felt paper.

Q. Would cement blocks answer?

A. We had one building made of cement blocks. We found that ordinary 8-inch cement blocks was about equal to a 13-inch wall, and either one of these is equal to about three courses of lumber.

Q. Would you line that with lumber?

A. Yes, and leave an air space as well; cement is not a good insulation. I think one of the reasons why the space left in cement blocks is not effective is that it is pretty hard to lay these blocks so that the joints are absolutely tight. If there is the slightest settling in the wall you have an opening.

Q. What about the ceiling?

A. The ceiling should be made the same as the walls, only I do not think it is necessary to have it quite so deep. The tendency of the cool air is to find its way out at the bottom, and it does not rise, and, therefore, the ceiling does not require to be quite so well insulated.

A word or two about the floors. First, where the ground is not dry we extended the concrete bed right under the ice-chamber, and then put on top of that about four or five inches of cinders or very dry sand—something that won't contain any moisture. Tanbark has been used. Over that we placed a false floor, and the main joist came above that. They have to be fairly heavy to carry the ice. The space between the floor and this false floor is filled with shavings, and over the top of the floor we put galvanized iron, because if you put ice on a common wooden floor it is only a short time before it will be destroyed. I think shavings between the joist would protect them considerably.

Here is another floor that was put in one of the factories in Western Ontario, and I understand it has proven satisfactory and to be a permanent floor: First they laid concrete, and then 4 or 5 inches of cinders, and then a row of square hollow tile laid on top of that, and then a finishing coat of about an inch of cement.

Q. What kind of a floor do you have in the curing room?

A. Cement.

Q. Don't you find that absorbs a good deal of cool air?,

A. No, it helps to cool the air. Naturally the temperature of the floor is about 55 or 60 degrees. Of course if you wanted to use the building for a cold storage it would be quite the reverse.

Q. How do you pack the ice?

A. We pack it as tight as possible.

Q. Would you pack it right full?

A. Yes, wedge it right in. It always melts a little from the walls.

Q. Do you put it just where the ventilator is?

A. It will melt enough around the ventilator. It melts away from the wall in a short time.

Q. I started to do it that way last year?

A. You might think there is no room for circulation, but it soon melts away, as soon as the warm weather comes in the spring. When I was in Denmark last summer I found a very strong complaint being made there because a uniform price was paid all over for the butter, and it is said the Danish butter is going down in quality on account of that. There is no incentive for a maker to make a really fine article. That is a very difficult question to deal with. You cannot put the blame all on one side. The competition is such that if one man won't take the cheese another will. Some remedies have been suggested, and some people have said we should have a man to grade the cheese. I had charge of the grading system in New Zealand for a year and a half, and I would like to point out some of the differences in the condition in New Zealand and the condition in Canada. The grading of cheese in that country is not for commercial purposes. It was done simply as a means of pointing out to the makers whether they were making a real good cheese or not, and there are not many cheese made in New Zealand. When grading was started there was a uniform price paid for all cheese. The system of buying there is very different. The buyer makes a contract with the factory to take the whole season's cheese, and you can see how that simplifies matters. Butter made in New Zealand must be shipped out by the first steamer having available space. The steamers always have plenty of room, so that the butter is shipped every two weeks. The butter is graded just before it is shipped, and it would not do to grade the butter in Canada if it is to lay in storage two or three months. I do not think it would be satisfactory. Official grading, I think, would create a good deal of trouble in the dairy business in this country. We have an Official Referee in Montreal, and he only examines a few lots, and if we had official grading everything would have to be examined. Another remedy that has been suggested is to have central warehouses in different parts of the country, where cheese could be shipped and selected and sold. That would increase the expense of handling the cheese, because it would have to be re-shipped to Montreal, and I think it would be better to ship it direct to Montreal and be done with it if you are going to do that.

Q. Is it possible to have cheese go through without being examined by the inspector.

A. Yes, the inspector is never called in to inspect cheese except by request. There have been about 43 lots in which his judgment did not agree with the judgment of the buyer.

I notice that the fruit business of the country has been handled very largely of late years under what is known as the fruit auction system. Fruit is shipped directly to a central point and sold by auction. There is sufficient competition to bring the full value, and there is no future dickering as to quality or anything of that kind.

I have sometimes wondered if it would not be possible to have, at Montreal, a large receiving depot where cheese and butter could be shipped regularly, and have a regularly established auction take place at a certain time every day or twice a day. The goods could be inspected before the auction took place, and there would be sufficient competition to insure that you would get full value for it. If it should happen that 400 or 500 factories went into a thing of that kind, and during the week some got more for their cheese than others, that would upset the auction business. We do not seem to be able to agree on any particular plan and carry it out. We cannot see far enough ahead to stick to any particular line, and that is where the Danes have us beat. They seem to be far seeing enough to see that it pays them to stick together. They develop a plan, and they are sure it is right, and they stick to it. I recognize there is room for improvement in this matter of the disposal of Canadian cheese. I know that too often the full value is paid for cheese that is not first quality. The trouble begins afterwards in selling, and then the deduction comes off the cheese-maker. There are some defects that the cheese-makers are responsible for, and others that they are not responsible for. I was amazed to hear to-day that cheese-makers were cut in price because turnips were fed to the cows. I do not think there is any court in Canada that would support that sort of thing. (Applause.)

Last spring we came to the conclusion that it was time to change in connection with the work of the Official Referee. The practice has been to class cheese as "finest" or "not finest." There was a standard for "finest," but "under finest" did not mean anything. It seems to me that there is no reason why we should not have at least three grades of classification of butter and cheese. Every other country in the world has at least that many, and there are a great many more in some places. It was impossible to bring the salesmen together to discuss the matter. I said the Official Referee in making an examination, shall use three grades, and we will make some standard for the three grades. I had the assistance of Mr. Publow at a conference meeting at Montreal in order to arrive at some definite standard, and then sent them out in the hope that the salesmen would adopt them. I would like to see something of that kind established. The criticism has been made that the standards are too high. I believe that from my knowledge of the trade that the standards are not too high. When you say clean, it is a clean cheese flavor, and you must consider you are applying that to cheese clean, sound and pure. If cheese has a bad flavor it is not first-class cheese, and you cannot make it so by calling it so. What would be a good body in butter would not be a good body in cheese, yet the same term is used. Something depends on the man who makes the examination. He must use judgment, and if he cannot use judgment he is not qualified for such a position. A clean, sound and pure flavor for July cheese would hardly be a clean, sound and pure flavor for a September cheese, and the man who examines the cheese has to take that into consideration. If anyone can suggest a better word I would be glad to have it. I have not yet heard a single suggestion in connection with this standard, no better word than what we have given. (Applause.)

Mr. Woodard, Official Referee: There have been a good many complaints from the factorymen in the country that the Official Referee in Montreal is in league with the buyers, but if you will come down to Montreal some time I think you would see a controversy once in a while between myself and the buyers. We cannot always agree. I want to state briefly how the work is carried on. If the cheese are sold, and the buyer thinks they are not first-class, and there is a dispute, then they call in the Official Referee, who passes his judgment on the cheese. Once in a great while I find I cannot agree with the buyer. I wish I could disagree with him oftener than I do; but I have to do what is right, and decide on things just as I find them, and if the cheese are first grade I have to pass them as first grade. A great many people say they have never seen a certificate of first grade, and, perhaps, you did not because your cheese may not have been first grade. The Official Referee only sees cheese that the buyer says is second or third grade. If the cheese are first grade the buyer in Montreal must take them as first grade, and if they are not first grade then you must settle that matter as best you can, and that is the point I want to make with regard to my position. If you get the buyer in Montreal, or your local buyer, to accept the cheese at the factory it will save me a great deal of trouble, but if you cannot do that then I have to come in.

The Chairman: We are honored to-day very much by having one of our large exporters on the platform, and I will call upon him to address you, in order that you may have a look at the kind of man we are doing business with, Mr. Hodson, Montreal.

A MONTREAL BUYER'S VIEWS.

By A. Hodson, Montreal, Que.

I must apologise for being the only representative of the Montreal Merchants' Association. Three delegates were appointed to come here, but none of them could come but myself. First of all, I want to say a good word for the instructors. They stand for the backbone of the dairy industry in the Dominion of Canada. We look upon your Association as being the most important body of men gathered in Canada. Manufacturers' Associations and everything else takes second place. (Applause.) We stand for better cheese, better eggs, and better hog products. If you take statistics with reference to these products you will find they outshine any other industry. Therefore, I say, let us have a little pride in our business to make it the best business in Canada to-day. The first step we took was to appoint inspectors. I have been in all parts of the Dominion, and there are very few factories that I have not visited. I have been in Prince Edward Island, Nova Scotia and New Brunswick, and as far south as Sarnia, and, therefore, I can say something about the different sections, and the enthusiasm that exists in each of them. At first the instructors were not liked. The people said we don't want instructors. We have good cheese-makers, and we have good men bound down to make the finest grade of cheese. I look upon the cheese made from Brockville up to Toronto as the best made in Canada, but from Brockville to Montreal the grade is not so good as Brockville West. I want to inform the President and this Eastern Dairymen's Association that right here in the city of Peterboro they have the best conducted Cheese Board in Canada. (Great applause.) I did not say that to have your applause. If you would come down here to Peterboro you would see how the Board is conducted. We welcomed the instructors down to Montreal, and we want them to come down again. We opened our warehouses and our storehouses, and Mr. Publow brought his instructors down there in order that they might see the cheese they had seen in the factories. I think it was an education, both for the buyers as well as for the instructors, and we want you all to come down again. We want the Western instructors as well, and we will have a good, jolly time in Montreal. And if you come down next summer, I will promise you, as President of the Association, that we will give you a good welcome, and try to send you back feeling that it was good for you to have been with us. I think the Official Referee, Mr. Woodard, has a mighty hard job to fill, with the factorymen on one hand and the buyers on the other. He is between the devil and the deep sea.

A Member: Which is the deep sea? (Laughter.)

Mr. Hodson: You will have to decide that yourselves. As he has said, we only call him when there is trouble. You know every cheese-maker makes the best cheese in the country. Competition is bound to come in. A lot of cheese was coming into Montreal from a factory, and one house was getting it regularly. One lot was wrong. The cheese-maker had never made a very high standard, and he said, "Well, if you don't pay me so and so I won't let you have the cheese." And they went to another firm, and they said: "It is fine cheese; send along your cheese and we will take it." And they paid him a first-class price for it two or three times, and then they began to cut him a little; and then he had to send his cheese back to the original house. Because another takes his cheese does not say that they are right. Mr. Woodard does not always agree with us, but we are prepared to stand by Mr. Woodard's judgment. If he says we are wrong we will pay up. I want you to understand he is not our referee; he is the Government referee, and you cannot turn one hair in his head in our favor. He is a man of a strong opinion, and he knows good cheese.

There has been a great improvement in the manufacture of cheese this year. I think the quality of our cheese has a good deal to do with the price we are getting, and I think the improvement that they made this year was owing to the work the inspectors have done. I cannot think of anything else to account for it. The cow only gives pure milk, and if everything is clean and tidy you will have good milk. If you feed turnips you will have a turnipy flavor. If you have a gravel hill on your farm, that is a good place to milk the cows. Do not milk the cows in the barnyard. The Englishman will pay well for the right quality of cheese. If we try to pass off a poor quality of cheese on them we get rapped on the knuckles over there.

I have been asked a great many questions about boxes, and I think we can make an improvement in that respect. We had a box come to our warehouse yesterday that I think is an improvement. It is altogether a new design; it is lock-stitched with fine thread, waxed and oiled. It is a patent of Mr. D. A. Macpherson of Lancaster. We took an axe and split it, but the box did not bulge one bit. You can pare the top of the box down so as to make level with the cheese. . He is working with a design so that he can bind the outer rim in such a way that it will not split. He should charge one cent a box extra, but he said he was willing to reduce the cost for a trial for the first year. He is going to equip one or two factories with these boxes. I had 100 boxes shipped, and only two of them were broken. We have had about 25 different boxes sent down; one was a tin box with a fancy outside and looked like a bandbox for a woman's hat; the lid was made of wood. It would not do. There is one box with upright wood; it is sound and solid and strong, and you can hardly break it; but you cannot put our strain on it, and the wood warps, and it looks very ugly. The Englishmen want the cheese put up in good boxes. We have sent word to some makers that we want them to stencil the weights of the cheese and we have sent them the stencils, and they sent word back that they haven't time to do it. I understand that there is going to be a prize given by the Windsor Salt Company for the best kept factory, and I hope the cheese makers will continue to have a pride in their factories. Don't sign an agreement to make the best cheese, but sign a contract to make the best cheese the factory will allow you to make.

I bring you most cordial greetings from the Montreal Producers' Association, and I want to tell you that we are one with you and we want to help you in every way that we possibly can, and if there is anything wrong being done we can make the man who does it suffer. We want straightforward dealing on your part, and I do not think there is any business done more honestly than ours. There is no combine among the Montreal buyers, and if you will come down there and go round and visit us I think you will be convinced of that in five minutes.

The Chairman: I am sure that we are more than delighted that Mr. Hodson has come down to visit us. We are pleased to have the Montreal cheese exporters, who handle this $22,000,000 worth of cheese for us in such shape. It has done remarkably well, and I say they have a very high character. The business is running as well as any business in Canada to-day. We have Professor Dean, Mr. Barr, and Mr. Publow and Mr. Ruddick on the platform. They are all Canadian boys, and if there is any question that you wish to ask them we will be delighted to have you do so.

A Member: Is the Babcock test really perfect or not?

The Chairman: There is no doubt in the world that the Babcock test is a perfect test, and will decide just how the matter is. It has been proven to do so if it is in careful hands.

A Member: I would like to ask if the pasteurizing of cream in a cream-gathering creamery has not a tendency to encourage carelessness on the part of the patrons. The reason I ask this question is that a man came to me this fall and wanted to send his cream to my factory. He told me he fed turnips, and he said, "If you pasteurize the cream it will take off the bad flavor."

Prof. Dean: If it has any tendency it ought not to have it. Pasteurizing is no excuse for carelessness on the part of the farmers in caring for the milk or cream.

A Member: Do you pasteurize and cool your cream and then churn, adding no starter?

Prof. Dean: We have done that. Pasteurize and cool, and run directly into the churn.

A Member: Do you get an exhaustive churning?

Prof. Dean: No; that was the weak point; the tendency was to have too great a loss of fat, but I think that can be overcome with cooling to a lower temperature and using a cream testing more fat.

A. Member: Would it be better to leave it cool for some time?

Prof. Dean: Yes, it would be better; but you might increase the labor, and we want to reduce the labor as much as possible.

A Member: Has the question of the disposal of sewage been brought up?

Mr. Barr: There is only one factory in the West that has the septic tank system. They make both butter and cheese there, and it has given very good satisfaction. They have a thorough system of underdraining, and they allow all their waste water to go into the tank. It goes from the first tank into the second one and then runs out into the tile; they have been doing it quite a few years and they are working yet.

A Member: We have a septic tank, and we run off our whey by gravitation, and there is not much fall, and sometimes the pipes clog up.

Mr. Barr: If you would take the water from the centre of the tank you would have four feet of water in the tank, and I would advise you to put in the pipe so that you will draw off the water from the centre, and then you will not take the heavy water or the grease from the top. The pipe clogs up because you are taking some of the solids. I believe it would be well for this Convention to pass some resolution recommending some system for taking care of the milk and have one system all over Ontario, and I believe we could get a system that would be all right. I believe we have a better class of factories in Western Ontario than you have in the East; but still we have one or two that are pretty bad. Next year, however, they will not be in that condition, and I do not believe we have more than twenty at the outside that are not kept in a very good condition.

A Member: Do you stir the milk during the process of cooling?

Mr. Barr: Stirring will assist to cool it down quicker and will keep the cream from rising.

A Member: Supposing you cool your milk in July below the temperature of the air and then do no more with it, and before morning it is back again to the temperature of the air, does that hurt it?

Mr. Barr: I do not think it will, but it is a better way to keep water around it so that it will keep cool.

The Chairman: I am sure we are indebted to Mr. Barr for coming East and giving us a very practical address, and we would like to have him keep in touch with the people of the East. I have no doubt in my mind but what he thinks they are doing better business up there than we are doing here. but he has not said so. But you can see it in his face that he thinks so. There is no doubt he should feel that way, but I want to give him just a little gentle hint that when he leaves us he can go West and tell the people there that if they are going to keep pace with the people here they will have to get on a better gait than they have ever struck in Western Ontario yet.

Mr. Barr: We will give you a good hot heat. (Laughter and applause.)

CO-OPERATION IN DAIRYING.

By Thos. McGillicuddy, Department of Agriculture, Toronto.

Co-operation is as old as Eden. The principle was first enunciated when the Creator uttered that historic dictum: "It is not good for man to be alone," and Adam was provided with a helpmeet. But in a far wider sense than the purely domestic it was intended that the great and beneficent principle of co-operation should prevail among mankind; for have not men been most prosperous, comfortable and useful where they have co-operated with their fellows: socially, educationally, commercially, industrially, religiously, and politically?

The dairy co-operative plan, like the celestial city described in the Apocalypse, "lieth four square." The *cow*, the *owner*, the cheese or butter *maker*, and the *buyer* are a quartette that must co-operate to the fullest extent if the best results are to be gained.

The cow is the first factor I have named. She is the *Alma Mater*—the fond mother, indeed—of our universal dairyhood. From her generous milk ducts flows one of the chief sources of our country's prosperity. If we cannot, like the Hindoos, offer worship to her, we may at least honor her for her work's sake. In the Province of Ontario alone there are some 1,000,000 milch cows, valued at about $30,000,000. These animals produce milk to the value of about $30,000,000 a year, and the greater number of them repeat the effort for several years, and even when through milking they can be sold for beef. The volume of the annual yield of milk in this Province is estimated at 3,000,000,000 pounds, or about a million and a half tons. Why, if that milk flow was turned into the Trent Valley Canal which winds by your city, you would need to use another lift-lock. (Laughter and applause.) The value of the milk production of Ontario is about double that of our wheat crop, and more than double the value of the products of our orchards and garden. All the cow asks in return for her work is a "square deal"—a generous, well-balanced ration, good stabling with pure air, and kind treatment. Then she will co-operate to the fullest extent, and will not hold back. Practically a captive, she must depend upon her owner largely for nourishment and quarters. She is, so to speak, a Mrs. I-will-do-as-I-am-done-by. The apocryphal story of the mean man who fed his cow a large proportion of sawdust instead of bran, when the faithful animal did the very best she could under the circumstances and let down a half-pint of wooden shoe-pegs, contains this germ of truth and practical suggestion: That the cow will respond according to the character of her feed and her care. (Applause.)

The second factor in dairy co-operation is the owner of the cow. He is the one who, it may be said, really produces the milk for factory purposes. In his effort at milk production he must co-operate with (1) the cow, (2) the soil, (3) the climate. He must carefully select the cow, and then as carefully treat her. He must also test his soil, and wisely treat it. A system of rotation, and the methods of cropping, must be mastered by him. If his land lacks nitrogen, for instance, he must tap the very atmosphere, and in that way store nitrogen in his soil, by raising legumes, such as the clovers, peas. etc. He must also wrestle with climatic conditions. He must anticipate the seasons; he must outrun the weather. By means of the silo, for example, he may supply cheap and succulent food for his cows in midwinter and spring, thus encouraging a summer flow of milk; and even in the drouth of midsummer he may feed juicy silage to his needy kine. Truly,—

> "The farmer's trade is one of worth:
> He's partner with the sky and earth,
> And partner with the sun and rain;
> And no man loses by his gain."

Co-operative dairying is only a little over half a century old. I well remember when a boy in Kingston about forty years ago seeing droves of milk cows driven through the city on their way to the dairying counties of the State of New York *via* Watertown. These were our best Canadian milkers, purchased for the factories of our neighboring State, for our cheese-factory system was then in embryo only. We were raising these splendid milking cattle, and then when they were at their best paying stage, were selling them to the more progressive dairymen of New York State. But about that time, or a few years before, Harvey Farrington, who had come from Herkimer County, N.Y., and had settled in the County of Oxford, in this Province, began to make cheese on the co-operative plan in Canada, and soon farmers of the Ingersoll-Woodstock district were into cheese-making in earnest. Mutual confidence is the basis of success in this as well as in every form of co-operation; and I am happy to say, that taking the general experience of the Province, no other branch of co-operative industry, and no other country in the world, can show so clean a record of concord and unanimity as has been displayed by those concerned in the great cheese industry of Ontario. (Applause.)

The man who makes the cheese or butter is the third important factor in our latter-day dairying. He must co-operate with the patrons of the factory, with fellow makers in the district, with the instructors and inspectors appointed by the authorities, and also with the buyers and shippers. It sometimes happens that he is forced between the upper and nether millstone of these conflicting interests, and happy indeed is he if he comes out of the grind with his spirit of manhood unimpaired. The cheesemaker deserves much better treatment than he generally receives. Too often he is underpaid. If a student of Holy Writ, he must sometimes think of Jacob's experience with Laban. Nevertheless, in the majority of cases, the fit maker makes good patrons; and as the dairy schools are yearly turning out well-equipped men for this work, it is to be hoped that the lot of the cheesemaker is to be brighter in the future than in the past.

And just here let me advert to the pleasant relations existing between the buttermakers and those who manufacture cheese. A decade ago these two parties could not assemble in the one convention without some degree of friction being plainly manifested. In short, they then dwelt in separate camps. To-day they look at dairying as a united industry. Many of the factories make both butter and cheese. The twain are indeed one, and let no man try to divide them. Neverthless, even a blind man can see that the butter industry is to increase in the future, and at the expense of the output of cheese. But this change will be so naturally accomplished that all concerned will be satisfied with the mode of transition. It will be gradual rather than hasty—an evolution, not a revolution.

The fourth side of the square is represented by the market man. The wholesale buyer is necessary to the scheme of dairy co-operation. Large consignments of dairy products of high and equal quality are imperatively necessary if the industry is to thrive. The skilled warehouseman, with his great list of customers, his trained judgment as to the quality of goods, and his knowledge of the market and its possible fluctuations, has earned for himself a place, and, taken all together, an honored place. Co-operation with his is necessary if the producer and maker would make the best disposition of the milk given by the dairy cow. The annual appearance of representatives of the Montreal shipping houses at your conventions is a sign that the quartette are in harmony.

But there is a fifth factor in the modern plan of dairy co-operation. The State—the Local and Federal Governments—has entered the charmed circle (or square). While not inviting paternalism, agriculturists have welcomed reasonable assistance and co-operation from the State, and in Canada it has been cheerfully and generously accorded: (1) By grants to Associations; (2) by the establishing of an agricultural college, dairy schools, and experimental stations; (3) by grants to inspectors and instructors; 4) by the publications of reports and bulletins; (5) by cold storage and shipping experiments; (6) by the appointment of an official referee to decide upon the quality of cheese and butter. It is not necessary to go into detail as to what these various agencies have accomplished. "By their fruits ye shall know them," and their fruits may be seen standing out in big figures among the leaves of the Trade and Navigation returns.

A cross-eyed bicycler once ran into a pedestrian, and both were flung to the ground. The bicycler jumped up and yelled at the other: "Why don't you look where you're going?" The reply the cross-eyed wheelman got was: "Why don't you go where you're looking?" (Laughter.) Are the dairymen of Ontario looking where they are going? Are they so co-operating that they may go where they are looking?

LOOKING FORWARD IN DAIRYING.

By Prof. H. H. Dean, O.A.C., Guelph.

During the last two days I had the pleasure of attending a convention similar to this in the State of Vermont. I listened to the addresses delivered there with much interest, and was forcibly impressed by the fact that all the speakers pointed out that dairying in that State had to depend upon co-operation for its development. In the old land, which I visited during the past summer, the people have thoroughly developed the co-operative system, and I found that they were willing to tell you all about their methods of farming, dairying, or about the packing industry and the gathering and exporting of eggs. Co-operation finds its way into every part of Denmark, and the undertakings are, to a large extent, operated by the farmers themselves. Everything has been worked out to a fine point, and their establishments are most economically conducted; nothing is wasted. It is said of American packing establishments that they make use of everything except the squeal of the pig. In Denmark they are thinking of going one better by exporting the squeal to Scotland to use in the manufacture of bagpipes. (Laughter.)

As an illustration of the loss that often comes to farmers through not taking advantage of co-operation, I will narrate an instance that came to my notice in the north of Ireland. I happened one day to be walking along the high road, and got into conversation with a farmer who owned about thirty acres of land. On my enquiring as to whether he patronized a creamery, he said he did not, because he thought it better to make butter at home, and besides he had the buttermilk. For his butter he was obtaining 12c. per pound, whereas, in Manchester and Liverpool, Irish butter was worth double that price. Yet he was perfectly satisfied to go on in the old way. On many farms in this country the butter is made at home and is traded off at the country store for dry goods and groceries at a lower price than the farmer could get for it if he sent his cream to the creamery, at the same time saving his wife a good deal of labor. I think we may properly ask why Canadian farmers do not go in for co-operation more than they do. To my mind, the development of the dairy industry in this country must be on co-operative lines.

What is meant by this co-operative movement? The term movement, implies life or action, and is exemplified in the splendid meetings held by this Association. The life, action, and fidelity displayed by the members of this Association are the characteristics that help to keep the dairy industry to the front. We cannot have life or action without the expenditure of some force or energy. It is this power which impels the people of this country to make money through their business—to obtain money or gold. I heard an old man once say that he had travelled around the world and that wherever he went the cry was "Gold, gold, gold," It is this desire for gold which impels the people of this and every country to put force and energy, thought and action into their work. In the village where I lived most of my life I remember a man who visited the village store every evening of his life except Sundays. He had held down a bench there for fifty years. Any man who is content to do that will never be more than an average, ordinary man. Are you content to be an average man, or have you a desire to be something above the ordinary? If you have that desire, it is one of the strongest incentives you can have to accomplish something worth while in this life. Most men and women are imbued with the desire to be above the average. If they will foster that desire and do everything in their power to bring about its accomplishment, they are sure to make their mark. Therefore, I say, that in connection with co-operation you must have life, energy, movement, thought and force.

We must never lose heart or we shall never win the race. Competition is becoming keener and keener in the dairy business. It is more difficult each year to make butter and cheese that will compete in the markets of the world. Every country is bending its energies to produce a finer quality of butter and cheese, and the only way by which you can successfully meet that competition is by co-operation or working together. We must not be satisfied with present conditions, but must continue to advance. Some people are satisfied, when they obtain good results for one year, to take a rest the year following. We cannot afford to stand still, but must be advancing all the time. The worst thing that can happen to our young people is to have no object in life—nothing to work for. Many boys and girls are spoiled because their parents have too much money. Mr. D. L. Moody once said, "Boys, you should eat the crusts while you are young, and your teeth are good." On a famous occasion one of the kings of England was asked by one of the generals to send reinforcements to the Black Prince, who was being hard pressed in the battle. He replied, "Let the boy win his spurs." My advice to the young men here is to eat your crusts while you are young, and win your spurs, and then you will be able to accomplish something in life.

The farmers of this country do not realize what can be done by co-operation. It is a system that might be applied with advantage to the buying of raw material. In the Old Country farmers buy their raw material at the lowest possible price and thus reduce the cost of farming. I believe that it is even possible by co-operation to reduce the cost of milking your cows. We have recently installed a milking machine at the College which is run by electricity, and the cows seem to like it just as well as hand-milking. I think it probable that the milking machine will come into practical use in this country, and that by co-operation a number of farmers would be able to join together and purchase one, driving their cows to a central point to be milked. That will mean a great deal to the women on the farm, who are now obliged to go out to the barn through the mud and dirt, which too often exists around the barnyard and stable, and milk the cows. I told the farmers in my district not very long ago that I expected before long to see electric lines from Niagara Falls constructed along the main road, and that farmers would be able to tap the wire and obtain electric power for the cutting of feed, churning, and a great many other things that are now done by hand power. Some say that is visionary, but I do not think so, because to a certain extent we have realized it already. We are now using electricity for cutting feed, pulping roots, milking cows, etc. These are some of the advantages which co-operation will bring about. The application of the principle of co-operation to the farming and dairy business means increased intelligence, comfort and contentment in our homes.

NOTES ON A TRIP TO GREAT BRITAIN AND DENMARK.

By J. A. Ruddick, Chief of Dairying and Transportation Branch, Ottawa.

I fully realize how much better it would be if you could take a trip of this kind for yourselves rather than listen to anything I may have to say about it. I had three main objects in making this trip last summer. First, to study our export markets; second, to study the methods of manufacture employed in other lands; and third, to confer with those who handle our produce on the other side and inform them what we were able to do in supplying them with a first-class article. From the men who handle our produce I received a splendid reception and although they are busy men, they took time to discuss matters fully with me. It was a matter of satisfaction for me to find that our butter and cheese were steadily improving their reputation on the British market. Canadian butter was being received with much more favor than was formerly the case. To my mind the principal reason for this lies in the fact that the facilities for handling our produce have been very much improved. It had been the practice in the past to allow our butter to remain for a considerable time in the sheds on the dock in the old country, exposed to a high temperature. This was particularly true at Liverpool and Glasgow, and to some extent at Bristol and London. I think it would be hard to improve on the facilities they now have at the port of London. In previous years all this sort of produce was discharged from ships at Tilbury, some twenty-six miles down the Thames, and then carried by rail to Commercial Road Station, from which point it was carted to the various warehouses. The Thompson and Allan Steamship lines made arrangements last year to put their ships into the Surrey Commercial Docks, and cheese, butter, etc., are there discharged into cold storage. Large dealers told me that on this account they were enabled to deliver our cheese to their customers in first-class condition; and that this had a great deal to do with keeping up the demand for cheese, and consequently in keeping up the price. The success of this departure at London is leading the authorities in other places to make a move in the same direction. When they have the same facilities at other ports, it will add very materially to the consumption of cheese in England. At Bristol they are spending $30,000,000 on a new dock, which is expected to be completed in a year and a half. It will be one of the finest docks in the old country, and they will have every facility for handling produce in the best possible way.

The consumption of our butter increased considerably during the past twelve months. One reason for that was the scarcity of continental butter. A great many dealers were afraid to try Canadian butter at first, but after trying it, they found it very much better than they expected, and if we can only follow this up with a still further improvement in the quality of our butter, I believe the trade will grow very largely. It is evident that we have nearly run the limit in the production of cheese. We are supplying eighty-five per cent. of the total amount of Cheddar cheese imported by that country, and we cannot increase our shipments very materially unless the consumption increases, and the consumption has not shown any material increase in the past ten years. There is a large increase in the consumption of butter, and if they succeed in stopping the faking processes which are going on, of adding to the weight of butter by incorporating solidified milk with it, the market will still further improve. I feel satisfied that the position of our dairy produce in the British market is better to-day than it has been for twenty years past, and that is an improvement which should be a source of satisfaction to all engaged in the industry.

While on my trip I had occasion to visit Ireland. It is not a cheese producing country, but it is a large butter producing country. They send to England and Scotland every year about $30,000,000 worth of butter, and I look upon the Irish butter as one of the greatest competitors Canadian butter meets with. It is very much of the same class, is put up in the same style, and is made largely in creameries. They have eight hundred creameries in Ireland, organized by the Department of Agriculture, and about two-thirds of the butter shipped out of the country is made by co-operative creameries and private concerns. They have a longer season than we have, and make more butter in winter than we do. One of the greatest drawbacks that we have in Canada is that we have very little to do in the winter months. I crossed by the Irish Mail and I met Sir Thomas Cleave, an ex-Canadian. He is engaged in the butter trade in the old city of Limerick. I also had the pleasure of meeting Mr. Robert Gibson. He is a writer of the most violent letters I have ever seen in public print. I had the curiosity to meet him, and I never was so agreeably disappointed in my life. He was very genial and hospitable, and he gave me a great deal of information on the Irish butter trade.

I also visited Cork for the purpose of seeing that famous butter market. Nearly all the butter is dairy butter and is put up in "keelers." I also visited the Munster Dairy Institution, one of those which the Department is conducting for the training of girls in dairy work, and I may say that they give an excellent training in all lines of dairying. Before leaving Ireland I paid a visit to Blarney Castle. Going to Belfast, I engaged a Jarvey and drove out in the country and succeeded in finding the old house in which my grandfather was born, some one hundred and twenty-five years ago. It is still standing there, and a very distant relative is living in the old homestead.

Crossing over to Scotland I had a peculiar experience. I was Irish while in Ireland, my father being an Irishman, but my mother was of Scotch descent, and I had to change my accent. When I landed in Scotland I met Mr. John Robertson, brother of our own Prof. Robertson, and we spent the afternoon together. I then went to Castle Douglas. Castle Douglas is situated at the junction of the great Northern from Carlisle and is the centre of a very important agriculture country. It is located in the Galloway district in the Shire of Kirkcudbright. Starting out from Castle Douglas on a beautiful Saturday morning and with good horses and the most beautiful roads I ever saw, I was able to visit some twelve or fifteen of those large cheese dairies where some of the finest of the Scotch Cheddars are made. I wanted to find out if I could, how it was that this cheese would sell for a cent or a cent and half more than Canadian; I wanted to find out if there was anything in the cheese or the mode of manufacture. I visited about fifteen places and saw a great many cheese, and although it was the month of July, I did not see a single cheese that could be considered off flavor; they were all very uniform and very much alike. The temperature went rather high in the curing rooms; I was told that in some of them it went as high as eighty degrees.

You understand that these are dairies, and that cheese is made from the milk of the cows on one farm. They keep from eighty to one hundred and fifty cows. I saw one herd of one hundred cows which yielded about five thousand pounds of milk per cow per year. It is not very hard to get two or three dozen to do that, but to get a hundred of them is a difficult matter, and I thought it was a pretty good herd.

The system there is something like this: They are all tenant farmers, but the tenant farmer is quite a big man and does not do very much work himself; he owns all the stock and the dairyman comes along and rents the cows. He is furnished with a house, a dairy and all the feed and stabling for the cows, but he has to do all the work, feeding the cows, milking them and looking after them in every way, and he pays so many pounds of cheese per cow as rent; so that he has to take an interest in the production of the cow and in the value of the cheese. Going into the stables in the middle of the day I was impressed with the almost utter lack of any odor or any sign of the animals having been in the place, and I saw them drawing water a considerable distance to scrub out the stables. They were just as clean as they could be, and that was the secret of their success; it is not because they have superior skill; they do not understand the principles of cheese-making nearly as well as our cheese-makers do, but they have a more perfect raw material, and they are able to make a cheese that will lie on the shelves three or four months and still be sound in flavor.

I also visited some dairies in Ayrshire. I was on the farm where Burns plowed. I was also on the original farm where the first Dunlop cheese was made some two hundred years ago, and I saw some magnificent stock. I certainly felt it to be one of the best object lessons I ever had in my life to visit that great cheese-making district; to see the way in which the cattle are handled and the care taken with the milk. The pastures are weeded and kept clean and have a splendid growth of grass, and the cows are always in perfect condition. Labor is cheap there. These men are on rented farms and have to pay big rents, and they are not farming for fun by any means. I did not find the Scotch farmer any different in that part of the world to what he is in Canada, and we do not find any Scotch farmers working for fun; they are working for the money there is in it.

It was a pleasure to visit the great commercial city of Glasgow and to interview the cheese merchants. There were some whom I had often seen in our own country. Mr. Andrew Clement was one of these; he was very kind to me and took me out to his farm.

I visited Dundee on the east coast and went up as far as the old town of Arbroth. I was very hospitably entertained by Mr. William Thompson of the Thompson Line, who took me over to St. Andrews to see the famous golf links. I afterwards visited Leeds, a city to which a great deal of our butter is shipped. Passing over to the continent I spent a day or two in Paris, and from there to Leige in Belgium, where an exhibition was in progress. It was admitted that the Canadian exhibit was the finest on the ground. Leaving Liege, I had my first experience of travelling alone in a foreign country. I found myself on a train where nobody could speak English. The guards gave me a lot of instructions I did not understand, and so to avoid going wrong, I showed my ticket at every station, and by and by a man pulled me out of the train and put me on another train.

There is not much in Cologne to interest one except its Cathedral, with its towers, five hundred and twenty-five feet in height. This wonderful building took six hundred years to build. It was begun in 1246 and finished in 1882. I met a number of gentlemen engaged in the butter trade in Hamburg, and there learned that Germany would likely be a large importer of butter in the future. There is such a great increase in population, and such a great prosperity prevailing, that a large class of the people who never tasted butter in former years are now able to eat it. The actual duty on the butter is three cents a pound, but I do not think it is a matter of much importance to us, because I think the British market is good enough; we can let the Siberian and other butters supply the German demand, and that will leave so much more for us to supply to Great Britain.

Passing on to Denmark, the great success Denmark has made in the last twenty-five years is due to thoroughness. Everything the Danes do from start to finish is done in the most thorough manner. I want to say the same thing about the Danish butter-maker as I did about the Scotch cheese-maker. They are no better trained and no more intelligent than our butter-makers, but they do things with great attention to detail, and in the most thorough manner. They keep the creamery as clean as possible, and use a great deal of lime in purifying and sweetening. There are no fences in Denmark, and the cows are tethered in the pasture field; I saw even sheep tethered. The cows are tied by a sufficient length of rope to reach over grass enough to feed them between milkings. At milking time all the cows are brought in and afterwards they are pegged out in another place. They consider that the cow wastes much less than if turned loose to run about the pasture.

The dairy buildings in Denmark are certainly superior to our average buildings. They are of a permanent construction, being built either of brick or cement, so that the hose can be turned in to the place. They have bath tubs in the creamery so that the employees can keep themselves absolutely clean.

The national brand of Denmark is frequently referred to. Until recent years an association controlled this brand, and all creameries belonged to the association and used its brand. Last year they adopted the plan of putting this brand on every package exported. They supply Great Britain with the butter that brings the high price, and other countries are shipping butter into England and calling it Danish butter. On account of the competition, practically one price is being paid for the whole of the Danish butter, so that there is no longer the same incentive to improve, and the quality of the butter is actually going off.

I made a short visit to Sweden. It is a great butter producing country, and they have a somewhat different system for applying the national brand. There a committee has charge of the matter, and they visit the export stores from time to time, select packages from different shipments, and when the butter is found to be up to a certain standard, permission is given to use the national brand. If they find on subsequent examination that the quality is not being kept up to the mark, the privilege is taken away.

I found the Danes quite willing to give me as much information as possible. I visited the famous Copenhagen Milk Supply Company, the pioneer of all city dairies. It was established some years ago, and it has been a great success. They insist on having the milk produced under certain conditions as regards cleanliness, and one of the principal points is having the milk cooled immediately after being taken away from the cows. I was there one afternoon when the cans came from the railway vans. Every one was opened and the dairy maids stood there taking their turns testing the milk. Every can that had the slightest odor was put aside and manufactured into butter. The milk is filtered after being received, put into bottles and cooled at once; that is all the treatment it receives.

I was shown a new milking pail which had been devised. It consists of an ordinary bucket with a large receiver, holding about two quarts, which opens from the bottom, and the idea is to put a mixture of ice and salt in this receiver in the centre, and milk direct on the cool surface. It seems to me that is carrying the matter too far, but it shows how much stress they put on that sort of thing. It is only twenty-five years since dairying began in Denmark. The Danish cow was then of a degenerate type, but by systematic selection, breeding and care, they have succeeded in that short time in improving her until she is one of the finest dairy cows in existence to-day. Thy have become a distinct race; they are all one color and all look alike. They are of a dark red, and are called the red Danish cow. I only hope those of you who are listening to me to-night may be able to visit these countries and have the same pleasure that I have experienced in doing so.

SPECIALIZING IN AGRICULTURE.

By C. C. James, Deputy Minister of Agriculture, Toronto.

I should like to imagine yourselves with me this evening on a trip into the country by electric car to a point say three or four miles from this city. Let us drop off at some farmer's gate and note our surroundings. First, we see a neat brick or stone house which has about it a noticeable appearance of comfort, with its garden and stretch of grass in front, where, if it is summer time, flowers are in bloom. Stepping inside we find that the house is equipped with electric light and a system of water supply, and that a telephone has been installed. Having surveyed all this, we conclude that here at least we have found the ideal home of the Ontario farmer. Let us turn from this picture and look back in our imagination to the time, not many years ago, when the old log house stood on the spot where this modern dwelling now stands. It was located in a small clearing in the forest, and the only means of access to it was the rough corduroy road which has now given place to a highway equipped with an electric car service. Marked as this contrast may seem, it has taken but a few years in the history of this Province to bring it about. When we contemplate the change, we begin to realize the rapid progress that has been made in agriculture.

In no branch of agriculture has progress been more marked than in connection with dairying, which we recognize to be one of the most important branches of all. It is a matter for congratulation that the dairy industry has just completed one of the most successful years in its history in this country. There certainly was never a better year for the industry in this Province than 1905. Having attained this height, let us pause for a moment and survey our position, and prepare and strengthen ourselves for the future. First, we recognize that the agriculturists of this Province, including those engaged in the dairy business, have ahead of them some important problems requiring solution. When we read the stories that are continually appearing in the press of the wonderful development taking place from week to week and from month to month in Manitoba and the Provinces of the Northwest, not many of us can refrain from wondering whether we are not making a mistake in taking no part in the wonderful progress being made. We are apt to conclude that the old Province of Ontario is being outstripped by these new Provinces, and that we are being left behind in the race. We are exceedingly pleased that other parts of the Dominion of Canada are making progress; in that progress we are bound to participate to a greater or less extent: but let us not forget, while we observe the rapid development taking place in the west, that we are citizens of Ontario, that we are concerned in a business which is of far greater importance to us than agriculture of the Northwest, and that in connection with that business we have problems to solve which demand our closest attention. The migration of people from the older provinces of Manitoba and the Northwest has exerted a very marked influence upon the agriculture of our Province. Year after year much of the best blood of the Province has been drained in this way until we sometimes wonder who can have been left at home to work upon the farm. Some have been left, however, and the work goes on, but the exodus adds to our list another problem for solution.

There is another way by which the agricultural situation is being changed, although indirectly, on account of the building up of the Northwest. I refer to the development of our manufacturing industries and the demands they are making on manual labor. The development of the prosperity of the west has resulted in attracting a large number of immigrants to this country, some of whom have been induced to come to Ontario. But we find that, even after these people have been distributed to the farms of the Province, it is difficult to hold them there because the needs of the growing manufactories draw them back to our cities and towns. For the reasons I have mentioned, the farmers of this Province are confronted with the labor problem, a problem which is a most difficult one to solve. The Department with which I am connected is endeavoring to do something to ameliorate the present condition of affairs. We are endeavoring to attract to this country an increased number of men of the class that will make serviceable assistants for the dairy, stock and fruit men of this Province. We ask that farmers who are desirous of securing help of this kind during the present year should communicate with us, and we will do our best to meet their requirements. You will understand, that in supplying help of this kind it is not always possible to fully and completely meet your demands in all respects. We will, however, do our best to supply you with help, and, in so far as may be, with the kind of help you require.

There is another important problem confronting our agriculturists, and that is the one of securing the maximum profit on their undertakings. It is true that during the past eight or ten years the expansion in the products of agriculture has been very marked in Ontario; it is true that we have increased our output of cheese and butter, beef and bacon, to an enormous extent. Nevertheless, we observe that representative farmers of this country, who, side by side with the manufacturers, have presented their case to the Tariff Commission, have made the statement that, notwithstanding this increased production, they are not receiving therefrom the pecuniary benefits they are entitled to receive. These men are men of intelligence, who would not intentionally misrepresent the facts. Their statement, in a word, is that their net returns have not been as large as their gross returns warranted. If this is the case, it is a matter that demands the consideration of those concerned in agriculture. If, in times of such prosperity as we have been having for the past five or six years, intelligent farmers from different parts of this Province will stand up before the Tariff Commission and show from their books that they are not reaping their just reward from the undertakings in which they are engaged, then I submit that the time has arrived when we must again take up and reconsider the whole question of the conditions surrounding agriculture in this country. To ascertain the reason for this we must enquire whether the farmers are spending more than they should; whether they are less economical than formerly; whether they are giving too much time to keeping up their social status; whether they are trying to live better and dress better than they should; whether the demands made upon them by the modern age are greater than they should be, or whether they are handicapped for want of cheap labor. These are questions that require careful thought and investigation before we can arrive at any conclusion as to the reason for the condition of affairs I have mentioned. One thing is apparent from the reports of our banks and other financial institutions, namely, that the bank deposits of this country are increasing, and we therefore conclude that there must be a class of farmers who are making rapid headway by saving more than was formerly the case. We must not, however, infer because one man is succeeding in making money in farming that therefore everybody else is necessarily making money.

Every farmer should, I think, from time to time, take stock of his business so that he may know where he stands, what progress he is making and whether he is keeping up with the times. There was a time in this Province when wheat growing was one of the leading lines of agriculture; when the farmer measured the results of his year's work largely by his wheat crop; but in Ontario it is no longer a question of how much wheat a man produces; that is a matter which has been settled for us by the Western States, Manitoba and the Northwest, and we are now living in a period when specialized work is necessary. If you have had occasion recently to travel over this Province, you will have observed that there exists a number of communities in which specialties have been developed. In one county you will find that some one crop is made the leader, and that it is a money-maker for the farmers in that section, because it has found a set of conditions as to soil, situation, climate and market that are exactly suited to its production. In the next county, perhaps, you find an entirely different set of conditions, and that, consequently, a different crop is being made a specialty of. As an example, I have only to point to the eastern part of the Province, where we find that the making of cheese has become the leading industry, for the reason that the conditions are eminently favorable to its development.

The section I refer to comprises the great triangle formed by the Ottawa river on the one side and the St. Lawrence and part of Lake Ontario on the other. Within these limits there is a large triangle of land on which good rich grass grows; where the rainfall is constant and regular, so that the grass crop is assured. In the early days the settlers in this section discovered that the natural conditions tended to the production of milk of the first quality and in abundant supply, and to-day we find there a cheese industry which has grown to enormous proportions. Similarly, you will find that in the western part of Ontario, and at some other points, the growing of apples has become a specialty. In other districts onions or melons, or some such crop as this is the specialty. I recently made a trip from Windsor to Amherstburg by railway, and on the banks of the Detroit river I observed a number of trim gardens with long lines of vegetables belonging, I was told, to a little French Canadian community engaged in the growing of long-pointed radishes, for which they obtain high prices in the leading American cities. They had discovered that there existed in the locality an area of land which would produce the finest radishes on the continent of America. I had never seen them on the Toronto market, but was informed that they were shipped by the carload to Detroit and Chicago where high prices were paid for them. On the north shore of Lake Ontario there exists a locality where pears grow to perfection, and where the growing of this fruit for the old country market has become a specialty. Other instances might be mentioned, but these will be sufficient to indicate the truth of the principle that, wherever men have found out just what crop can be grown to best advantage in a given section, and have turned their attention mainly to that crop, they have succeeded far better and have made more money than those engaged in general agriculture. Therefore, my conclusion is that specialization in agriculture will, in the future, be one of its leading features.

Another problem that confronts the farmer is the difficulty experienced in ascertaining under what trade conditions he will have to dispose of his crop after it is produced. It must be admitted that the farmer is just as much a manufacturer as are the men engaged in carrying on the cereal plant or the electrical works in Peterborough. But there is this important difference between them: the manufacturer in the town or city knows precisely to what market the article he manufactures is going and the market price for it, and in many instances he is merely filling orders which were taken months previously. It is not so, however, with the farmer. He has little to guide him as to what market conditions his crop may meet after it is matured, who his competitors will be, or what price he will receive for it. Until through co-operation supply and demand are brought into some relationship, the agricultural products of this country will never be put upon the market under conditions of equality with the products of our manufacturing industries. Therefore, I say that co-operation is an object for the attainment of which the farmers, dairymen, fruit men, and vegetable growers should continually strive. If it were possible so to regulate the cheese industry that our cheesemakers would be restrained from making any "fodder" cheese, it would assuredly be a good thing for the dairy industry. That power we do not possess, nor is it practicable for any Government to grant it to us. The remedy rests in the perfecting of a co-operative system, and until this is accomplished by the cheese men themselves it will never be found possible to put a stop to the manufacture of this product. Co-operation must also be extended along all other lines. In connection with the fruit industry, a splendid opportunity exists for its development. For years it was considered that the British Isles constituted the only outlet for our surplus fruit. Then it was discovered that a great centre of consumption existed in Winnipeg, and some small experimental shipments were made, but with poor results. In 1904, however, through the Ontario Department of Agriculture, some co-operative shipments were made. They did not pay, but they paid better than the individual shipments, and they proved that, if a larger number of growers would co-operate, fruit could be placed in Winnipeg at a profit. During 1905, the shipping of fruit to Manitoba on co-operative lines assumed for the first time fairly large proportions.

Some sixteen years ago when the American market was closed to us, the situation that confronted the farmer was a most discouraging one. The wonder is that our farmers survived at all. They grappled with the situation, however, and did not lose heart but held on to their farms. They gradually learned how to meet the new situation, and by their efforts they have built up the dairying industry, the production of beef and bacon, and the growing of fruit, until, to-day, these have become the leading lines of agricultural production in this Province. Their efforts have placed the agriculture of this country on a firm, sure and certain platform of prosperity. All will admit that the men who worked during those dark hours, days, weeks and years of adversity are deserving of every encouragement. I doubt whether they will ever receive the credit they deserve for what they have accomplished for the welfare of this country. The people of Peterborough know very well that their basis of wealth is not limited to their manufacturing establishments, but that the commercial prosperity of this country is based upon its agricultural prosperity.

If we read the history of this country, we shall find the story of the men who fought to protect our territory; the story of the men who achieved high rank in political life, and we may, perhaps, read of the men who have been successful in building up great manufacturing enterprises. These men have certainly done a great deal for this country; but let us not forget that there is another class, the farming community, upon whose efforts the real prosperity of the country rests. I cannot perhaps leave you with a better thought than this: if you would continue the prosperity that has been so marked during the past few years; if you would continue to build up in this city of Peterborough a flourishing, contented and happy community, you must not allow your sympathies to stop at the boundaries of your city. The wealth that is created in the country must necessarily flow into the city; therefore, let us not discourage the farmer, but assist him in every way that is possible. The farmer of this Province deserves all the credit we can possibly give him; he should have our hearty co-operation and sympathy, for he has played a large part in the building up of the Province in the past, and his part in the future will be equally important.

CREAMERY BUTTER-MAKING.

By J. W. Mitchell, B.A., Superintendent Eastern Dairy School, Kingston.

In addition to my duties in connection with the Eastern Dairy School, it fell to my lot to do considerable visiting amongst the creameries in Eastern Ontario during the past season. Hence it is but natural, I suppose, that I have been asked to take up the subject of creamery butter-making at this Convention. In doing so, I have decided to deal with a number of features of this branch of our industry rather than just a single phase of it, as I believe it more profitable that I should do so.

Some Statistics. Let me, at the outset, dwell briefly upon the magnitude and progress of our dairy industry, with special reference to the butter-making side of it; and in so doing I cannot do better than quote a few figures from *The Gazette's* recent report entitled "Export Trade of the Port of Montreal." This is as authentic a source of information as we have at hand at the present time, and if not absolutely correct is at least sufficiently so for all practical purposes. The total production of butter and cheese and the prices realized were both very satisfactory. While there was a slight decrease in the amount of cheese manufactured this was more than offset by the increase in the amount of butter produced. The total value of our dairy products for the year is estimated at over $80,000,000 The value of the butter produced was, we are told, fully $48,000,000. But as the great bulk of our butter is kept for home consumption the magnitude of this side of our industry is largely lost sight of. During 1905, we exported fully 80,000 packages of butter more than in 1904, and at least 225,000 more than in 1903. The year 1905 was, in fact, a record one in this respect. Not only did we export more butter, but the average price received for it was fully 3½c. per pound better than in 1904, or 24½c. as compared with 18 cents per pound. As a result of this happy combination of conditions, the value of our exports of butter for 1905 was considerably over $7,000,000, or fully $2,000,000 in excess of that for 1904. It is pleasing to note that the creameries of Eastern Ontario shared in the general progress made. I have reports from some 12 creameries and the combined output of these was 1,282,000 lbs. of butter for 1905, as compared with 981,000 lbs. for 1904, an increase of 301,000 lbs.

So much for quantity and price. In so far as we can judge from the general tenor of the reports that have come to us from time to time, it would seem that fair progress has been made in the way of improving the quality of the butter exported to Great Britain during the past year. This is the most encouraging feature of all, if as we hope, it is but an earnest of what is to follow; for our success will depend upon the improvement we can make in the quality of our products. Let us make no mistake upon this point, but bear in mind that the British consumer is no sentimentalist regarding his food, but will pay the most for the best regardless of whence it comes.

Our Cream-Gathering Creameries. As practically all of the creameries in Ontario are operating on the cream-gathering plan, it is butter-making under this system that we shall confine our remarks to.

The cream-gathering creamery system has many features to recommend it, and is, alike, popular with patrons and factory proprietors. It leaves the skim-milk in ideal condition for feeding purposes where a hand separator is used for creaming the milk, the cost per pound of butter for delivery to the factory is very materially reduced, and as the territory that a creamery can serve is greatly enlarged under this system, and the make proportionatley increased, the cost of manufacture is correspondingly reduced. Furthermore, it is especially suited to the conditions of sparsely populated districts. These features all commend themselves so strongly to the farmer that we believe that the cream-gathering creamery system has gained a strong and lasting hold upon the affections of those to whom our dairy industry really belongs. Nor can we say that we would turn back the tide if we could. The weakness of the system of course is the fact that *so much is dependent upon the work of so many*, and the hands of the skilled butter-maker are largely tied. But good, earnest, intelligent patrons working under favorable conditions can supply to a creamery a quality of cream that will make a fine quality of butter. At the same time we would say this, and say it most emphatically, that unless we are up and doing the advantages of this system will prove wholly or largely illusory; for the gain made at the manufacturing end will be more than swallowed up at the selling end through the manufacturing of butter of an inferior quality that must be sold at a reduced price.

CARE OF CREAM. The herculean task before us in connection with our cream-gathering creameries is the education of the patrons to properly care for their cream. When the cream leaves the farm it should be both *clean in flavor* and *sweet*. This means care and cleanliness throughout, and the providing of facilities for cooling the cream. The utensils used should be of the best quality and properly cleaned, so that there will be no danger of contamination from this source. In this connection, we would most strongly condemn the practice of not cleaning a separator every time it is used. In some sections of the country this most faulty practice is on the increase and cannot be too strongly condemned. Some separator agents who have advised this practice should be severely reprimanded by their employers for so doing. Special care should be taken to milk in a clean place and in as cleanly a manner as possible; for particles of dirt which fall into the milk at milking time are laden with organisms which produce the worst flavors with which we have to contend, and while thus harmful at any time, are doubly so under the cream-gathering creamery system where the cream is held for some time before it is sent to the factory. The milk should be creamed as soon as possible after milking, and for this purpose we strongly favor the use of a hand separator over any method of setting the milk, as it provides the most efficient and thorough method of creaming the milk, it enables us to make a cream of any desired richness—we recommend making a cream testing about 30 per cent.—the quantity to be cooled is greatly reduced, and the cream if properly cooled will be one of superior quality. Care should be taken to set the separator in a clean place and to stand it on a floor that can be kept clean and not on an earth or ground floor which is sure to get into bad condition sooner or later through milk being spilled upon and soaking into it, and thus causing bad odors. We would again admonish those who have hand separators to keep them thoroughly clean. We have met more separators than one in such a condition that they themselves would contaminate milk put through them. The separator bowl and its parts shoud not only *look clean* but should have a *clean smell* as well. If giving off any bad odors, examine all tubes and crevices about the bowl, for this is evidence in itself that there is dirt being harbored somewhere.

So much for cleanliness. This is in order to keep the milk and cream as free as possible from the organisms which work so much mischief. The next step is to cool the cream as soon as possible after it comes from the separator in order to prevent the development of those organisms that do gain access to it, for be as careful as we may milk and cream are never free of germ life. The warm cream should be put into a vessel by itself and thoroughly cooled before being added to the cold cream. The three most common mistakes made in handling and cooling cream are, that warm cream is mixed with the cold, the cream is frequently left too long before being cooled, and it is not cooled to and held at a low enough temperature. Cool it below 50 degrees as soon as possible after it comes from the separator and hold it well under that temperature until it is sent to the creamery. Send it to the creamery both *sweet* and *clean in flavor.*

STORING OF ICE. With but rare exceptions, the storing of ice for cooling the cream is an absolute necessity, and any substitute is at best little more than a make-shift. Ice may be stored in a cheaply constructed building, and a small lean-to, with a tank for holding ice and water will provide an efficient means of cooling the cream. Some farmers who formerly stored ice for use in creaming their milk have given up doing so since purchasing hand separators. This is a serious mistake. While a good separator will cream milk more efficiently than will any method of setting, yet it exercises no hypnotic influence over the organisms that cause the souring of the cream or that bring about other undesirable changes. We must store ice for cooling the cream and holding it at a low temperature, so as to numb these organisms and prevent or check their growth.

At the present time the great majority of our creamery patrons have not the facilities for properly cooling their cream, and the cream does not arrive at the creamery sufficiently sweet and clean in flavor for making butter of the finest quality, as it is frequently over-ripe and over-fermented. Since we have decided to adopt the cream-gathering creamery system, on account of the many substantial advantages it has to offer, let our patrons pay the price demanded for these advantages and so get the full benefit of the system. The chief demand is that they provide facilities for caring for their cream, that is, *that they store ice to properly cool it.* The managers of our creameries have a great missionary work before them in the training of their patrons, and they must grapple with it in earnest. They might begin by getting their best patrons to adopt the best system of caring for their cream and use these as a means of leavening the whole lump.

DELIVERY OF CREAM. The cream should be collected and delivered sufficiently often to insure its arrival at the creamery in good condition. This should not be less than three times per week during the greater portion of the season. Frequently cream is seriously injured in delivering it to the creamery. We have even seen collectors using ordinary milk cans in summer for this purpose. Cream received from the patron in the best condition would not, under such circumstances, reach the creamery in a condition fit for making good butter. The tanks or cans should be well insulated, and where the latter, in particular, are used they should be protected from the sun by means of a good canvas cover over the wagon. One of the most disagreeable flavors imparted to cream is that due to the sun's rays striking directly upon and heating the walls of a can, and this flavor is invariably passed on to the butter. Where the cream is delivered by individual patrons the can should be covered with a blanket.

CARE OF CREAM AT THE CREAMERY. Provision should be made for properly caring for the cream at the creamery, and in this connection we would specially mention the importance of having suitable vats, vats with plenty of space at the sides and end for water and ice for quickly cooling the cream in warm weather. We should like to see our butter-makers make freer use of the acidimeter than they have been making in the past, and in ripening the cream we would advise them to err on the safe side, that is, to under-ripen rather than over-ripen it. For a 30 per cent. cream .5 (5-10) per cent. of acid is quite sufficient.

AN IMPROVEMENT IN THE BUTTER EXPORTED. We were told that there was considerable improvement in the quality of our butter during 1905, or at any rate, that it reached the British consumer in better condition than in previous years. Personally, we believe this to be partly due to an improvement in the quality of the cream received at and the butter turned out from our creameries. It is, however, ascribed in part—and we believe rightly so—to the fact that the butter, instead of being held, was shipped more promptly and went into consumption earlier than in former years. Let us learn a lesson from this. Butter, unlike cheese, is at its best when freshly made, and is not a product that will remain so for any length of time, and early shipment from our creameries and early exportation from Montreal form one of the great essentials for the building up of a reputation for Canadian creamery butter. To this we might add that the storages at our creameries should be kept at a temperature not above forty degrees, that is, where the butter is shipped at least weekly, and where the butter is to be held longer than this the temperature must be reduced much lower—to freezing or below. It is important that the temperature be kept as constant as possible. The storages in many creameries are quite defective.

SAMPLING AND TESTING CREAM. Too great care cannot be exercised in the sampling of cream and the testing of it. It is much more difficult to obtain a representative sample of cream than of milk, and it is equally so to prepare and test the composite samples. We do not favor the idea of sending the composite sample bottles around with the cream collector. There is danger of the bottles getting broken, the samples may become partially churned, and through frequent heating in summer weather they are likely to get into a very bad condition, a condition unfit for insuring a thoroughly reliable test. It is much better to keep the composite samples in a suitable place in the creamery and supply separate bottles for the cream-collector to bring samples of cream to the creamery in. This plan possesses the double advantage of affording the butter-maker an opportunity of examining each patron's cream and of enabling him to keep his composite samples in good condition.

Some makers meet with considerable difficulty in testing their composite samples, on account of the mould that forms on and in them. A few drops of formalin—say 4 or 5 drops—put into the composite sample bottle at the beginning of the test period will prevent this trouble. We had this tried as an experiment last summer, in a creamery where they were troubled with this mould in the samples, and the trouble disappeared.

The composite samples should be kept in as cool a place as possible in order that they be in good condition for testing.

ENLARGE THE FIELD OF OPERATION OF THE CREAM-GATHERING CREAMERY SYSTEM. In concluding my remarks, let me say that I believe that there are two ways in which our creamery system could be enlarged and extended in Ontario without working injury in any way to our cheese industry.

In some sparsely populated districts where they are now making dairy butter in considerable quantity, and in more thickly settled districts where the herds are small and it would take a large area to support a factory, cream-gathering creameries could be established to the decided advantage of the people of the community and of our dairy industry. Where butter is made in sufficient quantities that quite an amount of it must go onto the market it is much better that it be made in a creamery where a large quantity of butter of uniformly good quality can be manufactured. Creamery and not home dairy butter-making is what we must depend upon to build up the butter side of our dairy industry. We are making too much dairy butter where creamery butter could be made in its stead.

Again, while I have no desire to convey the idea that I favor a general change from cheese to butter-making in Eastern Ontario—in fact I believe it would be unwise to do so—yet I believe that there are sections where it would be better to make such a change. I refer, particularly, to sparsely populated sections where the herds are small. The output of the cheese factories in such districts must of necessity be small, the factory buildings poor in themselves and poorly equipped, the quality of the cheese likely not the best and the cost of manufacturing high. In such sections it would be well worth considering the advisability of combining forces and substituting one well equipped, thriving cream-gathering creamery for three or four small cheese factories which can, at best, look for but indifferent success. This I believe to be worthy of serious consideration. For making cheese suitable for present day demands, we must have well equipped factories with good curing-rooms, and such conditions are not likely to prevail in factories whose output is small and likely to continue so.

A Member: Do you think it is a better plan to brush the udders off than to wash them off?

Mr. Mitchell: Where you use a damp cloth for wiping the cow off it has this advantage, that if there are any little particles of dirt on the cow they are not wiped off, but they are dampened to a sufficient extent so that they will remain on the animal until you are through milking. I do not believe in too much washing of the cow, because there may be sufficient water left on the cow and some of it will drop into the pail. If the cow's udder is particularly dirty then you will have to wash it off.

A Member: Would the brush be better than a dampened cloth?

Mr. Mitchell: I think it would be better in this way, that it would be much easier to keep it clean than a cloth.

Q. Do you advocate pasteurizing cream for a cream gathering factory?

Mr. Mitchell: That is a question. In the fall and winter I would strongly urge you to pasteurize your cream in order to get rid of the stable flavor. In the summer time, when some cream arrives in a somewhat overripe condition, it is a question whether we can derive much benefit from pasteurizing in the summer time.

Q. At what percentage of acid can you pasteurize?

A. You may pasteurize when the cream is sweet or you may pasteurize it when it is about fit to make butter; but when it is just nearing the coagulating stage then it is likely to go into a loppered condition if pasteurized at that stage.

Q. What is the expense of collecting and manufacturing?

A. In some creameries they charge as high as 3½ cents to 4 cents, and in others 3 cents.

A MEMBER: When I started at Lorneville we had a very small creamery, and we charged 4 cents, and as they sent more cream I lowered the price. I would not make it for less than 3 cents. I would not try to run a winter creamery at 3 cents a pound. I would handle a large creamery at 3 cents a pound the year round.

AN EXPERT OPINION ON CANADIAN CHEESE.

By A. W. WOODARD, OFFICIAL REFEREE, MONTREAL.

I am not going to take up very much of your time, as there is another speaker to follow me. I wish to say some things with regard to what I see during the summer months in Montreal, and in that connection I may say that I have a pretty good chance to see all kinds of cheese in Montreal. We find in Montreal all kinds and quality of cheese, a great deal more than we should. We have sweet cheese, off-flavored, sour, lumpy, and poorly finished and boxed; but while on the whole the season of 1905 has been most remarkable, at the same time the most satisfactory one so far as prices and quality goes that I have known. Beginning from the first of June, when all doubts of fodder cheese had passed, prices gradually advanced without scarcely any reaction until the last week of August, when the price reached in the neighborhood of 11½ cents. This high price so early in the season had the effect of lessening the demand from the other side, and prices gradually fell to 10¾ cents about October 20th.

The quality of our cheese had been very good and unusually uniform in make. It is rather singular to note that the chief defect up to June 15th, when the hot weather began, was principally "sweet" and "open," after this date the principal defect was "acidy" and "sour." This has been the case for two seasons.

Again, in September there was an unusual number of "open" cheese, due largely to the curd not being sufficiently matured before salting. It is often the case at this time of the year, although not to the extent found this year. No reason could be given except that the makers did not change the treatment of the milk to suit its requirements.

The quality of butter showed an improvement on the whole over last year, a decided improvement being noticed throughout St. Hyacinthe section and adjoining counties. I firmly believe that we are producing a better keeping quality of butter than ever before, although less opportunity was afforded to judge this year, on account of the butter going forward more regularly. There is also an improvement in the style and packages, some of the exporters getting their regular factories to copy Australian and New Zealand customs, both in the branding and style of finishing. There is yet a chance for a decided improvement along this line, especially in the branding.

Cheese from this section has been good; in fact when we get west of Brockville we find a decided improvement, both in style and quality, and I believe the reason for it is larger and better equipped factories. Taking the average output of a hundred factories west of Brockville and a hundred east of Brockville, we will have a difference of sixty or more cheese per factory per week from the west than from the east.

Again, the plea for small factories is that better cheese can be made than in larger ones. While it may be considered significant, yet the fact is that the average number of cheese in each lot examined by me during the year of 1905 was smaller in those classed third grade than in high grade, the difference being as follows:—

Lots classed first grade, 56.1 boxes; second grade, 53.4 boxes, and third grade, 43.1 boxes. Average for all grades, 51.1, same as last year. This proves that the smaller factories made more third grade cheese than the larger ones.

The remark was made during this convention that the farmer is the backbone of the country, but is it not a fact that the cheesemaker plays a very important part in the backbone of the cheese and butter business? Are our best makers getting just treatment? I admit that some of them do, but more of them do not. I think better treatment and more consideration is accorded makers in large than in small factories, where there is greater competition. If the maker is hired by the month he must accept the conditions and supplies as furnished him, which generally are, in a small factory, poor, including poor and ill-fitting boxes, or else refuse to continue in his employ. If he is a good maker and cares for his reputation, he will refuse to stay, and so we will lose the services of a good man. This is how our good men are fast becoming less.

During the season just closed I examined 1,872 lots, which represented about 92,830 boxes of cheese that were under first grade. Calculating this as 60 per cent. of all the poor cheese, and adding the remainder, 40 per cent., it brings the total up to 154,700 boxes. Calling the average cut of all under grades fifty cents per box, would make a total loss of nearly $77,350. Now, this I consider a very moderate estimate, and not at all in excess of the facts. The maker lost nearly all of this, and under the present regulations he will always be obliged to. Sometimes he should, and many times he is not to blame, as he encounters conditions over which he has no control.

The greater loss was during the hot weather, and everything points to the fact that the milk was poor and over ripe when delivered to the factories, as nearly 45 per cent. of the defective cheese during the hot weather were "acidy and sour." If some way could be found whereby this loss would not fall on the maker, only as it was found that he was directly responsible, there would be something for the farmer to think about and make some effort to improve upon. If the loss was shared by the patrons of the factory, the amount individually would be very little, but for the maker to stand it all means a great deal.

I think the patrons of the factory should give better attention in taking care of their milk. They certainly would if the loss was coming out of them. Would not any man who thought his pocket-book was directly affected if he neglected to do certain work, make special efforts to save a loss. Remember, I am not trying to relieve the responsibility of the maker, for I believe when it can be shown that only he is directly responsible for poor cheese he should stand whatever loss there may be; but on the other hand, if difficulty arises in the milk over which he has no control, I think he should be relieved of any loss that might occur in consequence.

Now I blame the buyer to some extent; perhaps he is encountering difficulties over which he has no control, the same as the maker; but I believe that if cheese were bought on their merits that matters would gradually shape themselves into proper channels for adjustment. As it is now, the price paid each factory from one week to another does not at all represent the quality of the goods. If the market happens to be active the poor cheese go through at the same price as good ones, thus putting a premium on inferior cheese. Now this is not treating the good makers fair. If the buyer can pay first price for poor cheese he should be able and willing at the same time to pay a higher price for a better grade. This, then, would encourage good makers to continue on improving.

Again, take the conditions which prevail during the hot weather when the milk comes to the factory over ripe and nearly sour. Last year up to June 15th, when the hot weather began, the chief complaints were "sweet" and "open" cheese, although not to any great excess, but just as soon as the weather became hot "acidy" cheese was common. From June 15th to 30th, 45 per cent. of the defective cheese that I examined were "acidy," and 20 per cent. were third grade. The maximum temperature at that time was running around 85°. From July 1st to 15th, 40 per cent. of the defective cheese were "acidy" and 30 per cent. of all examined were third grade. The maximum temperature at this time ran nearly 87°.

It will be seen by this that atmospheric conditions have a great deal to do with the quality of the cheese. So many "acidy" cheese prove that the milk was far too ripe when delivered to the factory, and the maker was not able to cope with it on that account. Now, had the milk been cooled down to a temperature of 60° it would have been in a much sweeter condition, so that the maker could have handled it according as he wished, and would have greatly lessened the number of "acidy" cheese.

It is often remarked: "If the milk is bad let the maker refuse to take it." But sometimes things are so bad that he would be obliged to reject nearly all. And again, suppose he did refuse to take it, would the patrons of the factory stand by him and uphold him in his action. Experience proves that the first thing they would do would be to start and agitate to build a new factory; or, if it was a joint stock company, enough patrons would get their heads together to have him discharged. Or if he was working for the owner of the factory, the owner would say take all the milk that comes; if you don't they will go to the other factory. But that same proprietor would not be willing to stand any losses that might occur as a result. This is the kind of treatment that our best makers are getting. On the other hand, there are makers who are a curse to the trade, because they will do just what I have condemned. They stay in the business and help to crowd out our best and up-to-date men.

We are often accused of repeating ourselves in discussing dairying, but what is dairying but a repetition of the previous year's work with a little effort to improve? Now let us begin the season of 1906 with a strong determination to improve. I know Mr. Publow and Mr. Barr will, and I know every instructor will; if he does not he should not be employed. The maker is bound to do his best or lose money. The farmer is the only man who says he doesn't care. Yet he suffers, nevertheless.

Now, let the farmer who is engaged in dairying do a little thinking. Let him go home from this convention, and think out plans for a milk stand that will kep out the rain and at the same time give a pure circulation of air. Then put it where the air will be pure and free from stable flavors, and let him think how best and clean he can do the milking and carry it to this model milk stand, and strain the milk into the can. After this is done think out some means of cooling the milk down to a temperature of 60° or under, and keep it there until delivered to the factory. That is one way he can help the cheesemaker. Then has he ever thought of some other way of helping the cheesemaker; now he holds his destiny in his hand. Not that authority which means ruination to the maker by taking his milk to some other factory just because he happened to send his milk back, but by taking better care of it so the maker will not have to send it back; or, if you will, a mutual understanding by which one can help the other.

Then let the farmer think which cow is paying for her board and which is not. He cannot tell unless he takes a cow census, which the Dairy Commissioner's branch is willing to help him to do. He may find it is the old black cow or the old white spotted cow, that are just the ones he did not for a moment suspect.

Then let the cheesemaker take ten minutes to walk around his factory. He may conclude that the whey tank is too near the factory and will move it so as to avoid those familiar smells; that it needs cleaning out once a week instead of once a year; that the whey spout needs repairing to prevent leaking, and that a cesspool should be filled in with clean gravel, and the drains repaired. Then ten minutes thinking inside of the factory may prevent bad flavors, and have closer and firmer cheese.

From now on until the season opens let us think, and then a little more thinking. Then when the season opens let us act. Then a little more acting and working may improve our conditions.

The President: This is a very valuable address, and I am sure we must all be delighted in having such an official who is so competent to fill the place.

LICENSING CHEESE FACTORIES.

Mr. J. R. Dargavel: I have a report that I wish to place before the Association. You will remember that two years ago at Belleville a committee was appointed to look into the matter of licensing cheese factories, and they were to report at the next meeting. The next meeting was held a year ago at Brockville, and the committee did not think they were in possession of sufficient information to present their report. They have been working steadily ever since in order to procure all the information they can on this very important subject, and I beg now to present our report which is as follows:

"We, the committee appointed by your Association to gather information and report on the advisability of licensing cheese factories and creameries in the Province of Ontario, beg leave to report that in our opinion while the dairymen of Ontario may not yet be prepared for such a measure, we believe that a thorough measure of sanitary inspection of cheese, butter factories and dairies is in the interest of the dairymen of Ontario absolutely necessary; and this Association would most respectfully petition the Government of Ontario to provide such legislation as may be required to ensure our cheese factories, creameries and dairies being kept in a clean and sanitary condition with a pure water supply.

Most respectfully yours,

J. R. Dargavel,
H. Glendinning, Committee.
R. G. Murphy,

There is no denying the fact that although we may pat ourselves on the back and say we are making a very fine cheese, yet it was alluded to here last night in Mr. Ruddick's address that our cheese was selling in London for from one cent to one and a half cents per pound under the price of the

English cheese, and he also told us that the cheese was not made in England as scientifically as our cheese was made here. He also told us that the climatic conditions were not so much more favorable, but he did tell us the reason why they were making cheese which was worth one cent to one and a half cents a pound more than ours was owing to a matter of cleanliness and having proper dairies, and the whole thing can be summed up in the word cleanliness and proper appliances for making a first-class article.

Take the volume of cheese that we made this year, and put it at the lowest estimate, one cent a pound, it would make a difference to us of two million dollars in one year, and that is a vast sum,—so vast a sum that none of us can really apprehend what two million dollars means. It means one-tenth of the amount that we exported. It means that it would have been just as well for our farmers if they had taken their milk every tenth day and thrown it on the ground. I cannot see why we should not be able to make a better class of cheese here if we went about it in the right way.

Of course we can understand that in this democratic country there are a great many objections to what some people term "force," and that is the reason why this committee has not recommended at the present time what might be considered the drastic measure of licensing factories, but we have recommended something, and I hope this Association will pass this motion here to-day. We have reported in favor of sanitary inspection, and we would like to see this sanitary inspection under the supervision of the Government. Some people might say the local board of health could provide the appliances, but anybody who has given the matter any attention very well know that no purely local effort will be successful, and that we must have inspection by a disinterested and unbiased official. This matter of licensing factories and sanitary inspection has been brought before the public of Ontario by our paper, *The Canadian Dairyman*, which is the organ of the Dairymen's Association, and too much praise cannot be given to that paper for the work that it has done along this line in educating the people as to what is required. I would commend this paper to every dairyman who is at all interested in dairying in the Province of Ontario. In adopting some system of sanitary inspection we have an example before us in the State of Wisconsin, the most progressive dairy State in the American Union, and there is no doubt that the dairymen of Wisconsin have been educated up to the point through the efforts of *Hoard's Dairyman*. The State of Wisconsin has a law providing for sanitary inspection, and they are enforcing it; and if I had time I would like to read some extracts from the Government reports of what they have been doing. However, I can assure you that they have done wonderful things in that State. I am sorry that this matter was not brought before the Convention at an earlier day when we had more time. Mr. Publow, I am sure, and every instructor, can tell you of the necessity of something being done in this line. I see by the press that Mr. Publow stated that he visited in one-half day nine factories which were not fit for making cheese. That is a deplorable state of affairs. Some people might say, "What do we care if there is a poor factory that makes poor cheese?" but I tell you we are all interested in this question. The good factories where they make the best cheese are interested in the quality of the cheese that they are turning out in the poor factories, because all the cheese is sold in England as Canadian cheese. It is sold on the average reputation of Canadian cheese and we must raise that average reputation. Therefore we are all interested in raising that standard, and I believe there is no way that we can set about making that advance better than by improving our cheese factories. The fault is not all in the factories by any means. It is with the people also who furnish milk to the factories.

My experience is that you cannot go to a man and say very much about the state of his milk or his dairy or the state of his herd or barns when the factory he is sending the milk to is not in first-class shape, and to my mind the point that we must commence at is the factories. I am sure that our Minister of Agriculture, who is ever ready to do everything for us that is reasonable and right, will help us in this matter. I am sure that when the Hon. Mr. Monteith is asked to appoint sanitary inspectors for the Province of Ontario he will grant us our request.

When we get sanitary inspection there will still be very much for us to do. This Association in the future must go on as it has done in the past, and try to raise the standard of our production, and in every way help forward this great industry. It is the most vital financial matter that we in the Province of Ontario have to face, and I hope and trust that this resolution will receive your cordial support. (Applause.)

Mr. DERBYSHIRE: I am sure we are very much delighted with the very excellent report that the committee has brought in. Some were disappointed that this report was not brought in last year. For my part I am not disappointed at all, because I am satisfied it was much better to carefully consider the matter and take time so that the report would be a substantial benefit. This report I believe is in the right direction, and I am sure this is a step in the right direction, and I feel sure that the Minister of Agriculture will see that this is put on the statute book, and that the advice of this Convention is carried out, and I am satisfied that the Western Convention will pass a similar resolution next week.

The report was unanimously adopted.

UNIFORM SYSTEM OF CARING FOR MILK.

By G. G. PUBLOW, CHIEF INSTRUCTOR, KINGSTON.

There is one important factor in this work that has not been touched upon, and that is a more uniform system of caring for the milk. I have gone over the figures with Mr. Woodard with reference to the cheese that has been rejected and the money it amounted to. I find a cut of $77,000 was paid by cheese-makers, and 96,000 boxes of cheese he found to be inferior and the common defects in this cheese were acidy, and I think that surely can be overcome. I said yesterday that the man who produced the milk was the greatest factor in the quality, not the cheese-maker or the cow. If the cow is in good health she will give good milk. Some foods you cannot feed and the people know this. But it seems to me very, very foolish on the part of the producer to have good cows, to feed them well, and take the time to milk them (and it is no fun milking cows)—it seems to me that it is very foolish to do all this and then not to take proper care of the milk. No matter how skilled the cheese-maker is he cannot make this product any better than the raw material you furnish him. Now, I cannot make myself believe that if this is the case the farmers won't do it. The milk must be clean and sweet and cool that is all. It must be clean in order to have a good flavor. If you sow mixed seed you will get a mixed crop, and if there are weeds in it you will get weeds. And so it is with milk. It is not fair to the cheese-makers of this country to ask them to pay $77,000 for the carelessness of other people. I blame the cheese-makers a good deal, because I think they could do more than they do in rejecting the milk. The average man is satisfied to get his milk into the factory without having fault found with it. He does not care so long as it is taken and he then looks for the cheque at the end of the month. We will never be progressive as long as we stop there. I want the farmers of this country to go further than that, and keep their milk in the best possible condition; and then go further than that and see that the cheese is made in the very best possible condition; because the profit that you get for this product is what it sells for above the cost of production. And you must keep the product clean, cool and sweet. It is a difficult thing to get the cheese all fancy in this country, because the most important part of this work is entrusted to so many. Just imagine one hundred farmers caring for the material in one factory. How difficult it is to have every single one of them to keep the milk in a sweet condition, especially when we know how hard it is to get skilled labor to help with the work. The time when we have the most poor cheese is when the farmers are very busy. It is an easy thing for me to say to the farmers "Cool your milk to sixty degrees," but it is not an easy thing to do. You cannot do it if you have not the appliances. You cannot cool it cooler than the atmosphere by dipping it. If the air is eighty degrees you are not going to get it down to sixty or seventy degrees. You cannot do it. There is nothing so susceptible to odors as animal fat, and to make that very clear to you I would state that some of the most delicate perfumes that are produced in this country to-day are extracted from the flowers by fat. The fat is spread on the leaves and the odor is absorbed in that way. It is the cream or fat in the milk that absorbs the odors, and if you leave a can of milk near a bad atmosphere the milk will absorb it. And when you realize how susceptible that fat is to bad odors you will see the necessity of keeping it in a clean place. Just so long as you leave it along side of a bad odor it keeps getting worse, and the minute you remove it from that place it ceases to get any worse because you have taken it away from these conditions. If it only absorbs and does not get any germ life it will never increase, it will never be any worse; but if it becomes seeded with low forms of plant life they will grow, and after you remove it from the place where the seeding took place it continues to get worse, and the higher the temperature the quicker comes the decay. That is where you get the gassy milk, that is why you should be clean. It won't do at all to allow the milk to become dirty, and then strain it out; because you only take out the dirt and you leave the germs in the milk. Milk sours from the sugar being changed into acid, and the higher the temperature the quicker that takes place. By cooling the milk you accomplish two things that are absolutely essential. You retard the growth of plant life, and you all know as intelligent farmers that you must have two things for rapid growth of plants, high temperature and moisture. That is what makes the weeds grow in your farm, and you recognize them at once. And we as cheese and butter-makers recognize the undesirable fermentations by the odors. We train ourselves to understand them, unfortunately for us the milk may be badly seeded and yet pass our inspection. It is not gone far enough when it comes to the stage where it has to be rejected. I have seen some of the worst curd made from milk that we thought was the very best. That shows we cannot become expert enough from the sense of smell alone to detect it. It will pass the most expert man, and show up in the process of manufacture after. No man should know better what condition that milk should be in than the man who produced it.

We have spent too much time, I am afraid, training the cheese-makers. We would have been further ahead to-day if we had gone to the people of this country and talked to them as we are talking to-day. We must educate the man who takes care of the milk.

What condition should this milk be in; what is the best temperature for you to keep this milk at so that the cheese-maker can make the most and the best cheese? I would say sixty-five degrees. If you have to put your morning's milk into the night's milk, and then draw it eight miles, it will be over-ripe; sixty-five degrees would not be cool enough in that case, it would have to go to sixty degrees, because the change in the atmosphere effects the milk. What would keep milk in good condition to-day might not to-morrow, or the next day, for you all know that milk will sour quicker in certain weather. Just whatever gives you a rapid growth in a plant will give you rapid fermentation in your milk; so you can see that if milk would come in a favorable condition in good weather at sixty-five degrees it might in some cases have to be reduced to sixty degrees.

See the labor you have to spend on your hay in some weathers. In fact you cannot get it in in good condition if the weather is against you. We have seasons in this country when it is most difficult for the farmer to attractive style. You do not go to the cheese factories often enough. It is a duty you owe to yourselves to go there. I wish the guarantee was taken off (applause), and then you would take a little more interest in the man who made the cheese. If you would go to your cheese-maker and say, "How it the milk? It it coming in as good as it ought to?" It is your duty to see that the other fellow does the same thing, and it is your duty to see that your cheese-maker does not take it from the other man unless he does keep it in proper condition.

Just a word to the cheese-makers. You have my sympathy, and you know it. Are you doing as well as you can? Our duty to these people who own the milk is to make this butter and cheese of the very best quality. We have some cheese-makers in this country who are a curse to it. The cheese-makers should know as well as any other man what the trade wants. Thousget the milk in proper condition, and there will be times when we will make this acidy cheese when every person is doing their very best. These are things that we must think about; it is absolutely essential that you cool the milk. How can it be done quickly and cheaply with the least labor? I say there is nothing that will cool the milk quicker than ice. I prefer surrounding the milk with cool water or ice. If you have running water put the can in it and it will cool it. If you have not sufficient water you must keep stirring the milk a little. A great many farmers have twice the milk they used to have, therefore it requires more attention. If you have ice of course it is much better. Make a long can about the depth of your milk can, and put ice in that can, depending on the amount of milk you have and the length of time you want to keep the milk. You will soon find out how much ice it takes to keep it in good condition. Set it in there, and go off about your business. It will stir the milk enough when the ice melts and shakes around in the can. If you have to keep the milk over more than one day it should be cooled down to fifty degrees. After the milk has been cooled below the atmosphere, cover it up, especially if there is danger of bad odors. I think the best thing to cover it with is a damp cloth. If you keep your milk in this way you can conscientiously go to the cheese-maker and demand good cheese. I say to you farmers of this country, see that no man handles your milk who is not a skilled man, and see that he makes you the most cheese and the best he can, and that he puts it up in an ands of dollars are being lost to the farmers in this country, and to the men who take good care of their milk, because some cheese makers do not know how to make a good cheese. I am glad to say that the instructors never were so well received by the people as they were this year. We must get closer to the farmer. Three things we want particularly: That is the patron doing his duty, the cheese-maker doing his duty, and the man who owns the factory supplying proper material. Remember that the cheese and butter should go on improving until it becomes absolutely right, and you can never do that until you have sound milk skillfully handled in a clean and sweet place. I believe there are no more skilled cheese-makers on earth than we have in Canada to-day, but we have some poor ones, and over 50 per cent. of our cheese factories are far from what they should be, especially as regards sanitary conditions. I said yesterday that if all the milk coming to the factories was as good as the best, and I mean by that clean and cool and sweet, it would reduce the number of pounds to make a pound of cheese by one-half a pound of milk. And if the curing-rooms and cheese factories in Ontario were all as good as the best, it would save one pound of cheese for every cheese made in Ontario. Now figure up what that would mean in your factory, and all that extra money would go direct to the pockets of the producers. We want an increased demand for our cheese, and let us do everything that we can to bring that about.

Moved by R. G. MURPHY, seconded by J. R. DARGAVEL, that the thanks of this Dairymen's Association are due and hereby tendered to the Mayor and Council, also President and members of the Board of Trade, the manufacturers, merchants and the people of the city in general, for their hospitality and kindness shown during the holding of the Convention. Carried.

Moved by WILLIAM EAGER, seconded by EDWARD KIDD, that the thanks of this Convention are due and tendered to the press and railways for the kindness shown delegates attending the Convention. Carried.

The CHAIRMAN: If we could just carry out what Mr. Publow has been telling us, we could make acres of gold. I think we have had a splendid convention, I think the people have turned out remarkably well, and I think if we were to hold another convention in the city of Peterboro we would have a larger attendance, and they would hang on longer. We are thankful for the attendance we have had, and for the interest you have taken in the meetings. We brought the best speakers, and the most practical men that live in the Dominion to-day to talk to you on this burning question of the day, and they have done the best they could. We have given you the best convention that it possible to hold in this Dominion. And now we want you to go home in 1906 with a leaf turned over. We want you to improve in every line—better cows, better stables, better fields, more educated men to take care of these cows, better milk wagons to carry the milk to the factory, better factories, and more skilled men to handle the product there.

The Convention then adjourned.

FINANCIAL STATEMENTS.

DAIRYMEN'S ASSOCIATION OF WESTERN ONTARIO.

Receipts.		Expenditure.	
Cash on hand from previous year	$ 183 07	Cash paid for prizes	$ 360 00
Members' fees	334 00	Expenses for convention	289 74
Legislative grant	2,000 00	Officers' salaries	182 00
Receipts from conventions, exhibitions, etc.	195 00	Directors' fees and expenses	180 70
Sale of exhibits	1,189 32	Expenses of instructors	42 54
		Periodicals for members	169 00
		Cost of reporting	70 00
		Cleaning office and sundries	31 02
		Office furniture	89 15
		Office rent	101 20
		Stock Dairyman Publishing Co.	300 00
		Telephone and Telegraph	53 49
		Express charges	10 50
		Purchase of exhibits	1,133 82
		Auditors' fees	9 15
		Balance on hand	718 07
Total	$3,901 39	Total	$3,901 39

DAIRYMEN'S ASSOCIATION OF EASTERN ONTARIO.

Receipts.	1904 $ c.	1905 $ c.
Cash on hand from previous year		196 55
Members' fees	400 00	180 00
Donations	445 00	100 00
Legislative grant	2,000 00	2,000 00
Instruction fees	5,220 00	
Advertising in programme	187 00	130 00
Total	8,252 00	2,606 55
Expenditure.		
Balance due treasurer December 31st, 1903	1,670 55	
Expenses for convention	31 00	101 75
Officers' salaries	250 00	350 00
Directors' fees and expenses	798 00	810 00
Printing, advertising, postage and stationery	43 00	132 25
Expenses of judges	25 00	
Expenses of inspectors	379 65	150 00
Periodicals for members	219 00	90 00
Reporting	110 00	120 00
Interest	29 25	
Two assessments on stock, Dairyman Publishing Co.		200 00
Instruction fees to Department of Agriculture	4,500 00	
Balance on hand	196 55	652 55
Total	8,252 00	2,606 55

Dairymen's Association of Western Ontario.

ANNUAL MEETING.

This Convention had the largest attendance, and was the most enthusiastic ever held by the Western Association. When the President, Mr. ROBERT JOHNSTON, took the chair and called the meeting to order, the hall was completely filled.

The Mayor and City Council, Board of Trade, merchants and people of Ingersoll generally had spared no pains in their efforts to see that the dairymen were well looked after during their stay at Ingersoll. The hall was beautifully decorated, among the prominent mottoes being "Cheese is King," "Butter is Queen."

PRESIDENT'S ADDRESS.

BY ROBERT JOHNSTON, ST. THOMAS.

It is my privilege as President of the Dairymen's Association of Western Ontario to welcome you to the thirty-ninth annual convention of the Association. It is perhaps known to the majority of the members of this Association that the town of Ingersoll is the birth-place of Canadian dairy conventions. On the 31st day of July, 1867, in Ingersoll, a meeting was called for the purpose of organizing a Dairymen's Association, and otherwise promoting the dairy business interests of the Dominion of Canada. The outcome of that meeting was the Dairymen's Association of Canada. And to-day we are here to report the progress that we have made in these thirty-nine years of work. In looking back over these years we do not realize the great work that the organizers of this Association have done. We rather take the credit to ourselves that we are the people who are making the finest cheddar cheese in the world,-forgetting that the principles laid down at that first meeting are being worked out to-day in the manufacture of our finest cheese and butter. In looking over the report of the meetings held in the early days of the dairy industry, I was struck with the sacrifice made by the pioneers of dairying to acquaint themselves with information that would enable them to manufacture a finer article. They travelled a long distance at great expense of time and money to take part in these meetings. The interest aroused is shown in their membership of two hundred at their first meeting.

The section of country surrounding this beautiful town of Ingersoll is one of the most prosperous in Canada. What are the causes that make the county of Oxford one of the wealthiest in the Province?. It is their up to date dairymen. They make dairying a specialty, and Oxford is one of the first counties to adopt co-operative dairying. It still leads all others in the output of cheese for the area devoted to dairying.

I have to congratulate you on the prosperous year of 1905. I consider it the banner year in the history of Canadian dairying. Prices of both cheese and butter being very remunerative to the producers of milk. The quality of our product has also been the finest in the history of the trade. It is very gratifying to know that our cheese and butter are of finer quality, and command higher prices and readier sales than ever before in the history of Canadian dairying. We must be making progress. Why should we not, with the Department of Agriculture furnishing us with the means to secure such men as our Chief Instructor, Mr. Barr, and his able staff of instructors working with the cheese and butter makers, and getting in touch with the patrons? I think that in future more time will be devoted by our instructors to the patrons, as they hold the key of the dairy industry. Unless they furnish the milk in the best possible condition, we cannot make the perfect article of cheese and butter, which it should be the aim of every cheese and butter maker to manufacture.

I noticed an article in the *Canadian Dairyman* intimating that we were not receiving value for the money spent on instruction. I think, if the writer would make a personal visit to our cheese and butter sections, and note the vast improvement that has been made in the quality of the cheese and butter, and also the improvement made in the buildings in the last three years, he would change his opinion. If the perfect condition prevailed mentioned in his article we would not require a dairy department in connection with our Province.

The output of cheese for 1905 is estimated at 2,600,000 boxes or about the same quantity as that of 1904, while our butter production shows an increase of about 65,000 packages, or a total of 700,000 packages in all, which means a total increase of value over 1904 of about $10,000,000 dollars. This, with our bacon trade, which is so closely allied with the dairy industry of $15,000,000, makes a total of $45,000,000. This, with the estimated home consumption of $50,000,000 worth of dairy products, make a grand total of $95,000,000 which passes into the pockets of the dairymen of Canada.

I am pleased to inform you that the work of our instructors during the past year has been most satisfactory, and the marked improvements in our cheese and butter is largely due to their untiring efforts. Of a total of 217 factories visited, 171 received regular monthly visits. Of the creameries of 71 visited, 53 were visited monthly. Over $50,000 have been expended on improvements in the various sections visited by our instructors. We still have plenty of room for improvement in our factories and their equipment, and I hope to see such legislation passed that will compel owners of cheese factories and creameries to place them in a thoroughly sanitary condition.

In Mr. Willard's address at the first meeting of this Association a generation ago, he emphasized the fact that we had to have pure milk and had to exercise the utmost cleanliness in our work, and that if we did pay strict attention to the details we could never hope to manufacture finer butter and cheese, and that seems to apply to to-day. We keep hammering away at the same old thing. I thought we were working at something new until I went over some of the old records.

In concluding, I wish to extend to the Department of Agriculture of Ontario, the thanks of this Association for the assistance furnished by that Department to your directors, and can assure them that all the departments of our work has been as economically administered as was consistent with good work.

We have with us to take part in our meeting some of the ablest dairymen of Canada and the United States, and it will be your duty to gather all the information from them that is possible for you to obtain and apply the lessons learned to your business the coming season. Our sessions will not be crowded with subjects, but will leave plenty of time for discussion. I want you to make the most of your opportunity, as free discussion of all the vital questions brought before you is the only way to gather practical information.

DIRECTORS' REPORT.

Your Directors beg to report as follows:—

We are pleased to be able to call the attention of the members of this Association to the fact that the experience of the past season has been most encouraging in every way to the factorymen and milk producers patronizing our cheese factories and creameries in Western Ontario.

Those well qualified to judge, report that steady progress is being made in quality and the finish of our cheese, and that the improvement in quality of creamery butter in Western Ontario is very perceptible. Considerable money is being spent in improvement of factories and creameries, their equipment, and surroundings, under the improved system of instruction, which the Association has been endeavoring to carry out through the support of the Department of Agriculture of Ontario during the past three years.

In the way of expenditure in the improvement of cheese factories and their surroundings, it is a pleasure to your directors to report that the Ingersoll group has taken the lead, and over $10,000 have been spent in such improvements during the past season in the Ingersoll group, according to Instructors' reports, and a total of over $30,000 in the 10 groups organized in Western Ontario. Further particulars regarding the work of instruction will be found in the Chief Instructor's report, which will be submitted to this Convention a little later.

The work of instruction among the creameries during the past season has been most encouraging, and marked improvement in the quality of butter turned out has been a feature of this work. We also note that the creamerymen are more fully adopting the system of selling their butter regularly, weekly or fortnightly, thus getting it upon the market in good condition, which is, no doubt, one of the means in obtaining the very satisfactory results that they have experienced during the season.

The creamerymen are also doing considerable to improve their storage rooms, in the way of new buildings, and improving those already built, so that they can be held at a low temperature. To illustrate what can be done with an ice storage, we would call the attention of the members to the fact that the storage rooms at one or two of our creameries in Western Ontario are so constructed, that the makers were able to hold the temperature of the rooms below 32° during the entire season. However, by no means have all the creameries such facilities, and a majority of rooms are not by any means what they should be, and we would urge upon the creamerymen, to still further improve these conditions.

Upon the whole, we feel quite certain that the quality of butter turned out from the cream-gathering creameries in Western Ontario was the best in 1905 than it has ever been. As an evidence of better quality, the butter has been more sought after, and the competition by buyers has been keener than for many years past, and the prices obtained are the highest of any season, we think, in the history of the trade.

The price of cheese has also been at the very top, and we doubt if there has ever been a season when the milk producers received more satisfactory returns for their labors.

Prospects for the future of the dairy business in Canada are very bright, and so long as we can furnish cheese and butter of satisfactory quality, our dairy goods will continue to hold an important place in the markets of Great Britain.

The work of instruction has been further extended during the past season, until we now have seven groups of cheese factories, which include 171 factories out of a possible 217, also three groups of creameries. It is the ambition of your directorate to still further extend the work until every factory is receiving instruction.

Your directors have recognized the cheese and butter exhibit held in connection with the annual convention of this Association as one of its prominent educative features, and it is very gratifying to note the increasing interest manifested by the members in this competition, so that there is this year a much larger exhibit than ever before, and which we have reason to believe comprises the best arranged, largest, and finest winter exhibit of cheese and butter to be seen upon the American continent.

In connection with this exhibit we have this year introduced a new feature in the way of a scoring contest, in which a first prize of $10, and a second prize of $5 will be given. We believe that this feature may be made of great benefit to the makers, and hope that they will enter into it heartily.

Having become subscribers to stock in the new dairy paper *"The Canadian Dairyman,"* it is encouraging to note the extent to which it is forging ahead, and winning for itself a wider sphere of usefulness in promoting the best dairy interests of Canada, and we would again recommend the hearty support of the members of this Association to this enterprise.

With what we believe to be a very capable Chief Instructor and an efficient Instructor's Staff, we have not found it necessary to hold many meetings of the board during the season. Only three meetings of the entire board, and two of the executive were called.

All of which is respectfully submitted.

Robert Johnston,
President.
Geo. H. Barr,
Sec.-Treas.

Upon motion of Mr. I. Steinhoff, seconded by Mr. Ballantyne, the report was received and adopted.

CHANGE IN METHOD OF ELECTING DIRECTORS.

The Chairman: I will now call on Mr. Barr to place before you an amendment to our By-law which the directors thought would be necessary. He will read it to you, and we want you to indorse it if it meets with your approval. It has been indorsed by your Board of Directors, and will be placed before you for confirmation.

Mr. Barr: I might say that in the past the directors have been nominated from the agricultural divisions. We find that the divisions mentioned in the old By-laws do not agree with the districts that we have in our work. For instance, No. 13 represents the counties of Algoma, Simcoe and

Parry Sound, and we never have anything to do up in that country with cheese and butter, and the suggestion is that we change our By-laws to read as follows:

"Moved by W. K. MacLeod, seconded by M. R. Brown, That section 2 of the Constitution and By-laws of the Dairymen's Association of Western Ontario be amended as follows:—The officers shall consist of a President, 1st Vice-President, 2nd Vice-President, 3rd Vice-President, Secretary-Treasurer, and directors, sufficient to make the total of Vice-Presidents and Directors correspond with the number of groups of factories and creameries as arranged for instruction purposes from time to time. The election of officers shall be based upon the grouping of factories and creameries during the preceding year, but at no time shall the numbers of directors of the Association be less than eleven."

I would like to say that I was possibly the first to make any suggestion along this line, and I am quite satisfied that if we had a good representative màn in each group that is formed for instruction purposes it would help me a great deal in carrying on the work of instruction, and it would help the instructors in that district as well as the factorymen and patrons, because we would feel that we could go to someone in that district who was familiar with the local conditions. At the present time we have exactly the right number of directors to suit our instruction groups and leave our President free, and I think it would be all right to nominate the directors and Vice-Presidents so that each group as we have them formed at the present time, would be represented on the Board of Directors. We hear a great deal, especially in Eastern Ontario, about forming local Associations. I do not think we need that in Western Ontario, because I think the more machinery we get the harder it is to work it out. I believe this is the proper thing to do, and I hope you will back it up. A man in Lambton does not know the conditions away down in Brantford section, and I think it would be better to have a representative man from each district that we are working in.

The motion was carried.

The CHAIRMAN: We have with us this afternoon Mr. Chas. F. Whitley of the Department of Agriculture for the Dominion of Canada, who will address us on the improvement of dairy herds. They have been doing a great deal with regard to this subject at Ottawa, and he will be able to give you a lot of valuable information especially for the farmers and what is valuable for the farmers should be valuable to the cheese-makers, because I think the cheese-makers should be the medium of education along these lines to the patrons. The cheese-maker should be the best posted man in his district in everything pertaining to the dairy, and he should know something about the different dairy herds and the best kind of a cow for a man to keep, and I think if our cheese-makers and butter-makers would keep themselves posted and take these matters up with the patrons, they could make things much more pleasant for themselves and make more money for the patrons than they are doing.

IMPROVEMENT OF DAIRY HERDS.

By CHAS. F. WHITLEY, CENTRAL EXPERIMENTAL FARM, OTTAWA.

I am exceedingly glad and esteem it a very great privilege to be with you to-day, in this the birthplace of dairy conventions and co-operative factories.

I must congratulate you, Mr. President and officers, upon the splendid gathering you have at this opening session, and I trust your meeting will be marked with discussion that will be both beneficial and interesting. I think I have one of the most important subjects that can be brought up at a dairy convention. We are trying to double the output of every cow in the Dominion, and honestly I do not see why it should not be done. This is a very big subject, and I do not want to take up too much time in talking about it because I think more good can be brought out by discussion, which you will notice by the programme, is to be led by Prof. Dean of the Guelph Agricultural College.

The question might easily be asked, "Is there any need for improving the average dairy cow of Canada? Is the cow at present producing so much that her record cannot be improved upon?" If so, then of course there is no necessity for further investigation or endeavor. But it seems to me that every dairyman will admit that there is great room for improvement along this line. The fact is generally recognized, but unfortunately not acted upon. We have more knowledge than we put into practice. "Knowledge is power," but only when acted upon, and the Dairy Commissioner's Department of the Dominion have been endeavoring to get the farmers to pay more attention to this matter. It has been gathering information showing the value of different dairy herds. In 1904 Cowansville, Quebec, was made the centre, from which the testing of 1,120 cows was undertaken for 72 farmers. During 1905 Ingersoll, Stratford, Mountain View, and Mallorytown, Ont., Kensington, P.E.I., and Huntingdon and St. Camille, Que., were made the centres for 30-day tests.

The first chart is an index of the work taken at the North Oxford factory, which is just north of here, and gives the result of 16 herds:

Thirty-day Test, North Oxford, Ont., ending July 10th, 1905.

No. of cows.	Average.			Highest Yield of Fat.			Lowest Yield of Fat.		
	Milk.	Test.	Fat.	Milk.	Test.	Fat.	Milk.	Test.	Fat.
	lb.	%	lb.	lb.	%	lb.	lb.	%	lb.
18	1,074	3.2	34.8	1,335	3.4	45.3	765	3.5	26.7
20	844	3.6	30.6	1,010	3.8	38.3	535	3.6	19.2
12	910	3.5	32.5	840	4.9	41.1	790	3.3	26.0
11	791	3.3	26.2	965	3.7	35.7	555	3.3	18.3
15	755	3.6	27.3	920	3.8	34.9	630	3.4	21.4
16	952	3.3	32.0	1,160	3.9	45.2	905	2.3	20.8
29	877	3.6	31.8	1,210	3.6	43.5	460	3.4	15.6
19	1,022	3.5	35.9	1,270	3.6	45.7	735	3.7	27.1
20	996	3.5	35.8	1,300	4.0	52.0	900	3.0	27.0
25	935	3.4	31.8	1,365	3.6	49.1	425	4.0	17.0
12	938	3.3	31.2	1,225	3 3	40.4	915	3.0	27.4
6	812	3.8	31.1	825	4.4	36.3	745	3.3	24.5
10	930	3.6	33.9	1,055	4.0	42.2	850	3.1	26.3
8	1,096	3.5	39.0	1,420	3.9	55.3	730	3.3	24.0
10	676	3.6	24.5	880	3.5	30.8	560	3.7	20.7
9	879	3.8	33.4	1,330	3.9	51.8	650	4.0	26.0
Average: 240	914	3.51	32.1						

You will notice what a very great difference there is between the best cow and the poorest cow, and it shows the necessity for every farmer to know just what his cows are doing. One of these is a particularly good herd, and I do not see why the man who owns them should not be entitled to honorable mention. It belongs to Mr. Arnold Cooke, of Beachville. I will also draw your attention to the excellent standing of another herd owned by Mr. Isaac Edwards, in which 19 cows gave over 1,000 pounds of milk with an average of 35.9, and his herd included three 3-year-olds. Another point that might be brought out, is the size of the herd. It is a common belief that a small herd will make a better average than a big one, but the herd of six cows did not do quite as well as a herd of 19. I think Mr. John Bowey, of Beachville, should also be mentioned. His whole herd averaged very well. I might say that I was rather surprised to find so many cows with not a very high test. There were over one hundred cows that tested under 3.5, and five herds that averaged under 3.5, and one man had eight out of twelve cows with one below that.

Now the last chart might be open to criticism. We do not know just how old these animals were, or when they calved, and that would have some bearing on the question; so I have just arranged these figures in a slightly different way and have eliminated all the heifers and farrow cows, bringing them on this general basis that they all calved in the spring of last year, and were between three and fifteen years of age, and the average remains, as you will see by the accompanying chart, practically the same.

Thirty-day Test, North Oxford, Ont., ending July 10th, 1905.

Breed.	Highest.			Lowest.		
	Milk.	Test.	Fat.	Milk.	Test.	Fat.
	lbs.	%	lbs.	lbs.	%	lbs.
69 Holstein................	1,420	3.6	51.1	905	2.3	20.8
	890	4.5	40.0	640	3.8	24.3
	1,420	3.9	55.3			
Average...............	989	3.4	33.6		Diff.	34.5
83 Durham	1,315	3.3	43.3	620	3.8	23.5
	895	4.3	38.4	1,120	2.7	30.0
	1,150	4.2	48.3	700	3.2	22.4
Average...............	933	3.5	32.8		Diff.	25.9
7 Ayrshire, Average......	877	3.3	29.6		Diff.	15.9
11 Grade, Average	901	3 7	33.1		Diff.	12.8
18 Jersey, Average	793	4.0	31.9		Diff.	19.9
188 Cows, Average	936	3.5	33.0			
240 Cows, Average	914	3.5	32.1			

The cows of which I could get particulars were 7 Ayrshires, 11 grades, and 16 Jerseys. Out of 188 cows tested at this factory there were 69 Holsteins that averaged 989 pounds of milk testing 3.4. The highest yield of any milk from any Holstein from this factory was 1,420 pounds, and the highest test of any Holstein was 4.5, and the highest test of fat was 55.3; and if you compare this with the poor yields on the other side, one cow as low as 905, 620 and 700 pounds of milk, and testing as low as 2.7 and 2.3, this illustrates more forcibly our contention that there is far more difference between individual cows of the same breed than between the different breeds. We are not asking the farmers to run an experimental station; we only ask them to use plain, reasonable methods in getting at the individual production per cow, and that is a matter that affects not only the farmer, but the dairyman as well.

Every farmer in Canada should be interested in improving his herd of dairy cattle; there should be no indifference. It has been proved by a large number of tests in Canada and the United States that a great many cows are kept at a very small profit, and some at an actual loss. The average production of the dairy cow in Canada can be and ought to be doubled. Farmers should have enough national pride in our reputation as a dairy country to see that it is done speedily. It can be done with little expense to the farmer. In fact the cost is such a bagatelle that no farmer should hesitate two minutes on that score. A suitable spring balance can be purchased for about one dollar, and is always useful about the barn and house; a small dipper can be obtained for eight or nine cents, and sample bottles for four or five cents, one for each cow.

The first and prime requisite is interest in the matter. You are already largely interested in one sense from the very fact that you practise dairy farming. There is considerable investment in land, buildings, stock and implements. Naturally you want the best possible returns as interest on your capital; you cannot afford, in view of the present heavy investment, to remain stationary. It is incumbent upon all to investigate so that the unprofitable animals may be disposed of.

I received from a bulletin issued in the State of Illinois the record of six good dairy cows compared with the record of six poor ones. Taking six fairly good typical dairy cows as reported on in that State, we find that the cost of a pound of fat varied from 6½ to 13½ cents, but as produced by six poor cows the cost varied from 14 to 52 cents. The average in the first case was 10 cents, and in the other 26 cents. Similarly the cost of 100 pounds of milk ranked from 30 to 50 cents with the good cows, averaging 38 cents, while with the poor ones the cost was from 54 cents to $2, averaging 99 cents. No more striking proof could be given of how easy it is to lose money with poor cows.

I take great pleasure in announcing to this Convention that we have made history this present year in Canada. We have started in the Province of Quebec the first cow-testing association in the Dominion at Cowansville, and twenty farmers there have agreed to carry out this work for the milking season, weighing their milk six times a month, and I am also very glad to announce that the Minister of Agriculture, the Hon. Sidney Fisher, still holds that offer open that where any twenty farmers will agree to do this work, the testing will be done free of cost to them by the Dominion Government. Michigan farmers have already started this work. They organized last October. There are over 9,000 farmers in Denmark who think it is worth while to test their milk and 165,000 cows are tested in this way, and inside of six years one group of 75 creameries, with a total of over 50,000 cows, have run up their average to 6,000 pounds of milk per cow. They increased their average by 821 pounds of milk per cow, and I do not know where you could find 50,000 cows with a record like that in Canada.

This will help to solve the problem of the poorly equipped factory because it will hasten the day when the unsanitary building will be done away with. You need not think there is going to be any over-production. I do not think that is at all possible, and it will help to keep the boys and girls on the farm.

I have been horrified to read this last week the terrible fact that there is an army of one million and a half of children under 15 years of age that troop to the factories and mines of the United States every day. God forbid that we should ever come to anything of that kind in Canada. I say keep the boys and girls on the farm, give them the benefit of fresh air and sunshine, and do not let them drift away to the factories and leave their good homes on the farm for the city, where they will be in the unhealthy and immoral atmosphere of the factory. (Applause.)

I submit to you gentlemen in all seriousness that by following out this work we are on the threshold of a great movement, and if we follow it out carefully and systematically we will increase the prosperity of the farmers of this great Dominion. (Applause.)

The Chairman: I may say that the talk Mr. Whitley has given us is of the greatest importance to the dairymen of Ontario. I make the statement that I think one-half of the cows that are milked by the farmers who are sending to the cheese and butter factories are boarding on them free. We often hear the patrons say, "Cows do not pay, because we only get $25 or $30 a year," but there is no reason why they should not get twice that much money from them. At a dairy meeting I made the statement that one of my patrons received $102 from one cow, and one gentleman in the front row said, "Say, that was two cows, and two good ones," and he was right. It just shows what can be done by proper work. There is no reason why the average of our milk production should not be doubled, and if we could do that we would not hear so much about cheese being a poor price and that dairying does not pay. There is no branch of farming that will give you as good returns for the labor expended as dairying. I was speaking to a man two or three years ago, who said dairying did not pay, but he has changed his mind. He put intelligence into his work, he selected good cows and weeded out the poor ones—but he did not sell the poor ones to his neighbor—and he shows that last year his cows made him $58 apiece. I hope you will thresh this subject out. Professor Dean and Mr. Ruddick are here, and this is a live question.

IMPROVEMENT OF DAIRY HERDS.

By Prof. H. H. Dean, O.A.C., Guelph.

As a boy I used to listen with a good deal of interest to the tales which my father used to tell of the time when he came to Ingersoll to sell cheese for the Harley cheese factory, and I never thought it would be my privilege to have the honor of addressing the people of Ingersoll at the Western Ontario Dairymen's Convention. I congratulate you and your Board of Directors upon the excellent work that the Western Dairymen's Association has been able to accomplish during the past year. The year 1905 will pass down in history as one of the greatest years that the dairymen of Canada have ever experienced, and the Western Dairymen's Association have had a great deal to do with the working out of these things which have made this the banner year.

Improvement of the dairy herds is a topic which I take great pleasure in discussing. If there has been any part of my work which has given me satisfaction, it is that part which relates to the development of the dairy cow. Development to my mind signifies three things:—

(1) That there shall be thinking;
(2) That there shall be doing;
(3) That there shall be continuing in doing.

Any man can improve in his cows or in any business in which he is engaged if he puts into it good hard thinking, and if as a result of this afternoon's talk we shall be able to stir up thought or action on the part of any who have come here to this meeting, we shall be well repaid and much of good will have been accomplished. The average farmer buys pure-bred stock and takes them home and very often finds they are very little, if any, better than common stock which he had. Will you allow me to give a personal experience on this point? My father is a farmer about twenty miles from Ingersoll, and I have always taken a deep interest in the old farm, and about ten years ago I said to my eldest brother: 'I would like to see you have better stock at home, and I am willing to put something into this thing." So I went out and bought some pure-bred stock with pedigrees as long as your arm, and they were taken home to the farm. After keeping these cattle about a year my father said, "These cows are no better than the common cows we have had on the farm since I have been farming," and as a result we sold these cows that we paid fancy prices for because they had fancy colors and pedigrees, but they proved to be failures when they were put into actual test. I have said over and over again that the place to get at the root of this matter is to improve on the dairy stock in this country. (Applause.) But we will never get improvement so long as men will continue to buy and pay good money for pedigrees and fancy points. I am glad to see Mr. Whitley take up this work and do so well as he has been doing.

The Minister of Agriculture is on the platform, and he can correct me if I am wrong, when I say that, so far as the dairy department of the College is concerned, we shall buy no more pure-bred stock and pay fancy prices for them unless the owners are prepared to say to us, "We know that these cows can do so and so as a result of a test made by an independent person," and we can be reasonably sure that the work has been done accurately. I hold that it is in the interest of the breeders of pure-bred dairy stock to get after this question. It is a well-known physiological fact that the boys of the family inherit the characteristics of the mother and the girls inherit the characteristics of the father. That law applies all through the animal creation, and if a man wishes to improve his dairy stock he must do so by a purchase of a pure-bred male. It is time, therefore, that we stopped paying fancy prices for fancy points without performance, and the breeders of pure-bred stock should be able to say: "This animal was bred from a cow that has a record at the milk-pail."

The next point that I wish to make is that the value of systematic yearly records is not sufficiently realized by the farmers of this country, and I would like to point out to you some of the results obtained from our own herd that we have in connection with the College. We have a herd of about 25 cows, and for fifteen years we have been weighing the milk regularly from each cow in the herd and taking samples and testing them for the percentage of butter fat, once a month.

During this past year we had two cows in our herd which gave over 10,000 pounds of milk each; four cows that gave over 9,000 pounds; six cows that gave over 8,000, and eight cows that gave over 7,000 pounds; seventeen cows that gave over 6,000 pounds, and the average for the whole herd, good, bad and indifferent, was 6,062 pounds. The poorest cow in the herd was a little over 3,000 pounds, and the best one over 10,000 pounds, and what is true of our herd is probably true of a great majority of the herds in this country.

Two of our cows gave over 400 pounds of butter, 10 over 300 pounds, and the average for the whole herd was 261 pounds of butter. Four of our cows made us a profit of over $100 over the cost of the feed, selling the milk at 4 cents a quart. The bulk of the milk produced by our herd is sold at 4 cents per quart. Eighteen cows gave $50 in profit over the cost of the feed.

A MEMBER: How do you reckon the feed?

Prof. DEAN: Five dollars per cow for pasture. There is no way of finding out how much one cow eats more than another in the pasture field, and we charge them all up at the same price. The feed is charged at the market price excepting hay, silage and roots. Hay is charged at $6 a ton, silage $1.50 a ton, and roots 7 cents a bushel of 60 pounds; bran costs about $16 per ton; oats cost us $24 per ton; oil cake costs from $20 to $22 a ton. No allowance has been made for the value of the skim milk or the manure, no charge made for labor, and the profits I speak of are the profits above the cost of feed. The average cost per cow this past year was $28.70; the highest went up to $43 or $44 and the lowest was $22. In a case like the latter it would be a cow bought early in the season, and that was not in the herd for the whole year.

We have been carrying on this work for fifteen years of weighing and testing the milk from individual cows. At the present time we are not able to do it in the same way, because we milk our cows with a milking machine, and we meet with this difficulty, that with the machine two cows are milked into the one pail, consequently it is impossible to weigh each individual cow's milk, but we take samples once a week. At the end of 1906 our results will probably not be so accurate as they have been in the past, but they will be near enough for practical purposes.

I would like to say that I believe we have successfully solved the problem of milking cows by machinery. Last night a number of men came in to see the machine in operation and they were highly delighted with it, and I believe that before very long all you will have to do in the morning will be to turn a button, roll over and have another snooze, and when you wake up the cows will be milked. (Applause and laughter.)

Coming back to this question of improvement of dairy herds, let me emphasize the point that the place to start at is with the pure-bred stock. The majority of you who have the ordinary, common everyday dairy stock can improve them by the use of pure-bred males belonging to the dairy breeds. A plan they are carrying out in the wonderful country of Denmark is that the farmers should form what they call a testing association. It may not be practical to carry these things out on the same lines as they have them in Denmark, but I believe that if the farmers of this country work together instead of expecting the Government to do too much for them, they will be in a much better condition. I think we as Canadians expect the Government to do too much for us. I was over in the State of Vermont, and they said we had the most paternal Government in the world. One man asked me this question: "Is it a fact that the farmers and others rely upon the Government to do too much for them?" and I said that perhaps there was a tendency in some directions to do that. I say, let us do something for ourselves, and I say that if we had some such organization as testing associations, we could do much good, and I am glad to say that the Minister of Agriculture is willing to give some reasonable amount of assistance if we will form such association.

Mr. Ruddick, the Dairy Commissioner, will explain just how far they are willing to go. It is astonishing to see the number of men who are satisfied to get $15 and $25 per cow from the cheese factory, and if it costs the average farmer $28 to feed a cow for a year, how many cows would he have to keep in order to get rich at the end of ten years? (Laughter.) What the farmers of this country should do is to weigh and test the milk systematically from each and every cow in the herd.

The President in his opening address referred to an article in the *Canadian Dairyman*. I have not seen that article for some time, but I think it is unfair to say that it was there stated that "the instruction work was not properly carried out." What the article did say was—and that we may fairly ask ourselves—"Are we getting value for expending $30,000 in that way?" That is the question which I think every Canadian has a right to ask. I believe the instruction work in the past has been good, it has been done to the very best of the ability of the men who had it in charge, but we may ask ourselves, "Is there not some better way?" Is there no room for improvement? Any Board of Directors or anybody else who is so thin skinned that they cannot stand a little criticism should not occupy a prominent position, and I believe a man has a right as a Canadian to criticise, and if there is room for improvement then I believe that improvement should be made.

The Chairman: There is a great deal of truth in what Mr. Whitley says. If co-operative tests were inaugurated by the patrons and then carried out by them, they would manifest more interest and probably get more good out of them. The only way to introduce any new mode of procedure is for some person to initiate it. With regard to what Prof. Dean spoke of, I looked over that article, and I thought it was a reflection on the work done by the instructors and by the directors and by the Dairymen's Association. The directors have spent a good deal of time at no profit to ourselves, and in the past a great deal of money, in the furtherance of the dairy industry, and while we are quite willing to have any just criticism made of our work, at the same time I do not think the article was fair, because I know that the work done by the instructors has been well done and a great benefit to the industry.

I was for twenty-two years a maker of cheese and during the last three years I have been a buyer, and I know our product of cheese was never so uniform in this part of the country. You can take a lot of cheese out of ten different factories and put them into one car and send them to England, and they would not know but that they came from one factory; and that was not the case ten years ago. Our instructors are the best class of men we can possibly get and the remuneration paid them is not too large. The only fear of the directors has been that they could not retain them on the salary they were giving. I know that Prof. Dean has the interest of our dairy department at heart, and we will let the subject drop.

J. H. Monrad: I cannot keep my seat. What Prof. Dean said about pure-breds touched my heart. It is a matter that has been going on for the last twenty years, selling animals with pedigrees without performance, and it is always the poor farmer who is caught in that way. I was caught in that way myself nearly thirty years ago by buying animals with a pedigree and no performance. Some breeders will talk what a cow has done for a week or a month; they should give us the average for a year. Prof. Dean has touched the bottom of the foundation stone of improvement in our dairy business. I am from Denmark, and I came out loaded up on this talk that has been going on this morning. In fact a good deal of my thunder has been stolen by the previous speakers. Before the organization of this testing association that they have in Denmark they had what they called breeders' associations. A few farmers would join together to buy a good bull, and then they formed rules and appointed a committee of these men that knew a good cow when they saw her, and they would go around and look at the various cows and only the best were bred. These associations could properly be joined together with test associations. A farmer with a few cows cannot afford to buy an expensive sire, but he could afford to join with two or three others and get what he wants. The want of co-operation is the weak point among the farmers in the United States, and I expect it is the same in Canada. It is a case of every man for himself and the devil take the hindmost. (Laughter.)

I want to plead with you Canadian farmers to put a little of your character in your dairy work, and if you do that you will be able to co-operate, and you could go to work and help your neighbors. I was away from Denmark for ten years, and when I returned I was astonished at what they had done by this co-operation. They even started a sanitarium for consumption based on 6 cents per cow. They subscribed that much and paid it annually, and they borrowed money and built a sanatarium where the patrons of these creameries could go if they were taken sick. I understand now they have started another association, and they pay one cent per hog for another sanatarium, so that you see that there is no end to co-operation in Denmark. I plead for you to start in and co-operate just by selecting cows and testing them, turning out the poor ones and improving your herds by getting better sires. And don't be fooled by the breeders of pure-bred stock (Applause.)

A MEMBER: Mr. Whitley has told us about the results of cow testing and I am very much interested in the matter. A man comes to me and he says, "You can tell by the color of the milk that it is pretty good milk and that it is a pretty good cow." Do you think that is a fairly satisfactory test?

MR. WHITLEY: What is the color, blue or yellow?

A MEMBER: If it is rich, it is very yellow. Do I make a mistake in judging her a first-class cow?

MR. WHITLEY: I think the test is the best thing.

Q. Is the color an indication of the quality of the milk?

A. Not necessarily so. It is some indication. You have to go down to the Babcock test.

Q. I have a cow that gives me a great deal of milk. Would I be safe in calling her a good cow? Am I perfectly safe in considering that she is a profitable cow?

A. If she gives 1,800 pounds the first month and then breaks off to 500 or 600, she is not nearly as profitable a cow as one that starts in to give 1,000 pounds and keeps it up.

Q. Supposing I churn the cream from my cow once or twice a year and she gives me so and so, could I fairly judge her upon that?

A. Personally, I would not be inclined to go and take any cow unless she had been tested for seven weeks; I would not say once or twice a year by any means.

Q. I am speaking of a churning test?

A. I should prefer seven weeks.

Q. If I bring a sample of milk from each of my cows that I have taken this morning, and take it to the factory and have it tested, is it of much value?

A. Not necessarily so. Your cow might have been chased by a dog, and your test might not be three-quarters what it should be.

Q. Then you mean to say that I cannot get it in any other way except by some systematic method along the line indicated?

A. We recommend that.

Q. There is no other way?

A. I do not believe so.

Mr Sleightholm: If we can get the production up then our manufacturing is going to go up. I am thoroughly convinced from my own observation, as well as from the observation of such intelligent men as we have had to talk to us, men of experience and reliability, that this means more dollars and cents practically to us as manufacturers than any other one thing in connection with our business, and there is no use wasting time over a lot of unnecessary ideas in connection with what a cow is or is not outside of the actual production the cow makes in twelve months. I feel as strong on this as Prof. Whitley. I would like to ask Prof. Dean a word or two about feeding. I have had presented to me from time to time ideas like this. When I buy eight or ten cows and in twelve months I am in debt, what is the trouble? Why could I not buy eight or ten cows and make as much money as you?

Prof. Dean: You could if you got the right kind of cows and fed them properly.

Q. Could not I go out and buy a good cow?

A. Some men claim they can, but I have seen very few who could. (Applause.)

Q. How am I to get good cows?

A. Only by weighing and testing the milk; there is no royal road to learning.

Q. Does it pay to feed a dairy cow well?

A. It certainly does. Some men have the idea that when a cow goes dry that they can feed her on about sixteen straws per day; other men would give her seventeen or possibly eighteen. Now it has been proven that the time to build up a cow's system is when she is dry. Our practice is to give four pounds of meal per cow per day all the year round when they are in the stable, whether milking or not, and by feeding them in that way when they freshen they are prepared to go to work at once.

Q. If you give a cow a chance she ought to be dry six months in the year?

A. That is giving her too good a chance. I think from six weeks to two months is long enough for any cow to be dry.

Q. A good many of the cows we have milked six or seven months more or less and some of the time they did not milk at all, can we make a profit out of a six months cow?

A. It is very difficult to. I would give that cow to some man I had a grudge against. (Applause.)

Q. We are apt to compare our herds with herds that we hear about that make so much money. Now Prof. Dean says, he sells milk for four cents a quart, can you give us any idea how that would compare with the price we received from the cheese factory?

Prof. Dean: During the past year we have bought from the farmers about Guelph from 5,000 to 6,000 pounds of milk per day, and we have paid these farmers from about eighteen cents per pound of fat to as high as twenty-five cents per pound, and these prices would compare with what is paid at cheese factories and creameries. Of course in your cheese factories you pay according to the true value of the milk. You do not pay the same price for skim-milk and watered milk, but you test all the milk, and the returns I speak of are for the value of the milk according to the fat, and the profit from one cow was $40.06. The total value of her fat was $84.52 and she cost us about $44.46 to feed her for the year, that left a profit of $40.06 over the cost of feeding. That was the best cow we had in our herd. The poorest was $2.29. The average for the whole herd was $20.98. A gallon of milk weighs ten pounds. Exactly 10.3. Generally we say two and a half pounds to the quart.

Prof. Ruddick: I just want to state another word on what has been said by Mr. Whitley in connection with this work of organizing cow testing associations. The Minister of Agriculture has announced that where twenty or more farmers would organize an association of this kind that the Government will do the testing this year for nothing. I hope to see a great many associations organized where the Government will not be asked to do that work. One association has been organized not in connection with any factory. I think the best unit for carrying on this work is organization of the factories. The patrons of any factory can combine to do this work and have it done at the factory with the least possible outlay and trouble, because you have a convenient way of keeping the samples, and I think the majority of factories and creameries can very easily afford to take this work up and give it some attention. The Government cannot undertake to carry on work of this kind indefinitely. Reference has been made to Denmark. We have certainly a good deal to learn from them along these lines. The Government there has done very little work, nearly all the great movements there have been initiated by the farmers.

I hope the factory managers will take hold of this work and organize. They have thoroughbred cattle in Denmark and pedigree cattle, but along with the pedigree goes a record of the performance every time, and if that does not come up to the mark the pedigree is not any good, and any dairyman that will buy a cow without a performance record is very foolish. That is the work that the breeders' association takes up there, and that will be done here as soon as the dairymen refuse to buy animals unless they have something more than a long string of names behind them. (Applause.)

The Chairman: I have listened with a great deal of interest to the remarks of Mr. Ruddick, and his plan is one that which should be adopted by every cheese factory and creamery in this Province. They should be co-operative associations. We have with us this afternoon the Minister of Agriculture for the Province of Ontario, and as it will be his first appearance before an audience in Ingersoll, especially an audience of dairymen in Western Ontario, and I am very pleased that he is to meet such an audience that we have here this afternoon. It will impress upon him the fact that dairymen are alive to their interests in this part of the counry. I have very much pleasure in introducing to you the Hon. Nelson Monteith, the Minister of Agriculture for the Province of Ontario.

ADDRESS.

By Hon. Nelson Monteith, Minister of Agriculture, Toronto.

I do not think I need to apologize for appearing before an audience of dairymen, for I can assure you that I feel at home amongst you. It has been my good privilege to have been born in a dairying district in the adjacent County of Perth. We have been in the dairying business for a long time, possibly not so long as in this good old county of Oxford, but for many years the dairying industry has brought wealth into that splendid agricultural district as well as into yours.

Away back in the year 1867 a cheese factory was erected on the adjoining farm to where I have lived all my life. From that fact I became conversant with the dairying business in my younger days, and I have kept in touch with it up to the present time. (Applause.) I am glad as one of you, as a tiller of the soil who has been constantly in touch with the agricultural interests of this country, to know that this great industry of dairying is forging ahead and holding such a splendid position in our country. In looking over the returns published by the Department of Agriculture I am exceedingly gratified. You might possibly ask where do we get these returns? We have throughout the length and breadth of this Province of Ontario, an expert staff of correspondents, over 2,000 of them, who keep us in constant touch with the agriculture features of the day in their various localities, and we corroborate the information that we glean from these sources by the returns sent in by the clerks of the various municipalities, and this gives us a reasonably accurate data. We find by these returns that this great old county of Oxford is well up to the front in the dairying industry. You are outstripped in the output from two other counties in the Province of Ontario, Leeds and Hastings. They lead Oxford in the matter of dairy production. But taking your area into consideration, Oxford still holds the banner position, and for that reason I think it is seeming that the dairymen should come together in this splendid county, the home of the dairying business, and hold a dairy convention under this new Government. I think it is fitting indeed that you should gather together in such an assembly as this and discuss matters of importance in connection with our business.

It has been said that possibly we have been trending too much towards paternalism, and the force of that was brought home to me recently in reading a report of what they had accomplished in Denmark. We know that the government of the day in that country does not presume towards paternalism to any great extent; the people apparently are self-sufficient in the matter of co-operation.

We know that in the early part of the century, through the devastations of war, Denmark was looked upon as a very much impoverished country, and the result was that she figured low down in wealth per capita. But what do we find to-day? We find Denmark listed as second among the European nations in wealth per capita; and this has been brought about largely by her agricultural methods. Some twenty-five years ago, through the failure of grain growing as a means by which agriculturists could bring wealth to their store, Denmark looked around for something better, and believing, as we believe, that knowledge is a power that gives people an advantage over people who are less fortunate in the matter of education, she looked to experts to lead the way. Happily she was furnished with these experts, who pointed out that through the medium of the dairying industry better results could be attained. Like us, apparently the whole community has turned to that great source of revenue, and as a result you find to-day that Denmark occupies a proud position as a wealthy country. We find that Denmark last year received ten millions of dollars in excess for her excellency of quality, and that should make us consider the value of quality in our production. No doubt we are doing well along dairy lines. We can point to an output of almost thirty millions of dollars, and that is a vast amount of wealth to distribute among the farmers of this great Province of Ontario. But it is well for us to make just such an inquiry, as you are making this afternoon, as to whether we make this output at a profit; whether we are not working with obsolete implements; whether the cattle we are using are the best that can be obtained. These are live questions. We should ask ourselves as to whether our present methods are the best to bring about the very best results.

Not only that, but I may also possibly treat upon another line of thought this afternoon, something that touches closely the interests of this great County of Oxford, namely, the bacon hog, which goes almost as a necessary adjunct to the dairy. I find by the reports of last year that the bacon production of Oxford was some $910,000. That is a vast sum of money. It almost equals your dairy output, and is of very great importance indeed; and we are just at that singular position to-day, when we are possibly at the turning point. Many farmers say, "Now is our opportunity, we will force the curers and packers to our terms." I think that is a very unwise position to take. Many farmers rejoice at the fact that the packers are compelled to depend solely upon the hogs of Ontario. That is no doubt a reasonable situation to a great many of us who are producing hogs. But, remember, if we are going to hold the proud position we have attained in the old country markets we must not look at that question in that narrow light. Continuity of supply is one thing we must consider if we are going to hold our position with the British consumers, and it is up to us to see that these packing establishments do not run short in the matter of the raw product. I hope to be supported by the farmers throughout the length and breadth of this country in trying to reach a reasonable bases upon which the packers and producers can satisfactorily work out this great problem of the bacon industry. We have to grapple with it to-day. We have to educate the people of this Province to the fact that their interest and the packers' interest are almost identical. As in the dairying industry you have been so well educated, it is necessary for us to follow out that same line in dealing with the bacon product as well.

I find upon looking up the records that we are losing a vast amount of money in the hog industry from the production of light-weights and heavy-weights. These are two classes that the packers, under present conditions, are handling at our loss, and possibly to some extent their own loss, and when I tell you that there is some forty per cent. of the hogs marketed in this Province classed either light or heavy weight, and selling at from two shillings to five shillings per hundred weight of a loss in the old country as compared with the sizeable bacon, you will begin to realize that there is much to learn yet in the matter of marketing the bacon product. These are some of the things that should be interesting to us. No doubt there is a loss by bruising and soft pork, and many other things, but to my mind the matter of heavy-weights and light-weights is something we can deal with, something that comes home to us that we can arrange without any great injury to our interest.

Then we have a great many other questions we might well consider this afternoon. The matter of an expenditure of $30,000 for instruction work that has been spoken of is something that may come home more closely to me than to any of you, from the fact that this is one of the estimates that I will have to justify upon the floor of the House. I am glad to be with you this afternoon and to hear the discussion upon the work in the western part of the Province. The dairying industry has given great results to agriculturists as a whole. In the west our industries are more varied than in the east. We have here a fertile soil, that has enabled us to produce grain and many other crops to a greater extent than they have been able to in the eastern part of the Province. We have been established for a longer time under advanced agricultural lines, but I can tell you that the eastern dairymen are making more progress than the western dairymen are, and it is up to you to see that they do not outstrip you in the matter of progress.

I am glad to be here this afternoon to speak to an audience composed of so many young men. The great bulk of you, no doubt, are here to receive technical knowledge along dairying lines, and I regret to say that my training has been theoretical; so much so, that I would not dare to venture to tell you something that you are not already conversant with. But remember this, that the climbing of the ladder of fame and bettering your position in life is largely in your own keeping. If you are a cheese-maker endeavor to make better cheese. There is room at the top. Mr. Barr, your chief instructor, who comes from my own county, may not always be with us. There is room at the top; so that you see it is worth an effort. There are other men engaged in instruction work, who as years go on will be given places, and it is up to you to fill their positions and fill them even better than they have filled them. These are some of the things I wish to leave with the young men: Don't become self-satisfied; don't feel that you have reached the topmost round of the ladder. There is always somthing for us to learn, something for us to do, and it is well for us that each day we add something to our store of knowledge. I know that since coming to this hall this afternoon I have added to my store of knowledge.

I would like to add a few remarks along the line of work we are endeavoring to pursue in the Department at Toronto. That Department has a great many ramifications, but the dairying industry is one of the leading branches. The Eastern and Western Dairymen's Associations comprise, we believe, the most advanced agriculturists in the Province of Ontario. They have a great responsibility, and I would put it to you that when you come to select your directors, remember that they are largely our advisers. Therefore you expect progress at the head you must face the responsibility, and in appointing men to advise us I hope you will act wisely and elect men who are thoroughly progressive, and who are up to the latest achievements in the dairying line. We have another branch, namely, the Agricultural College at Guelph, which I am glad to say holds first place in the minds of the agriculturists in the Province of Ontario. And not only that, but it holds a very prominent place in the minds of agriculturists throughout America and in the old land as well. We are proud of that fact, and I cannot but say that it gives me a feeling of pride to see in the Live Stock Arena at Chicago, just the other week, three of the graduates of the institution at Guelph—three Canadian boys—successful as expert judges. This kind of work makes people throughout the length and breadth of this continent look to us, not only as advanced agriculturists, but as the place where they produce the best class of men. (Applause.) You have your responsibility. Do not imagine you can leave the responsibility to John Smith or John Brown. The responsibility is on each one of you as individuals.

My friend spoke on co-operation, and that is the beginning of success in almost every human effort; confidence in each other. Let not that confidence be shaken. Let us have honest and fair dealing, and if we maintain these standards, we need not fear about holding our own in any competition in the markets of the world. Be honest with yourselves and honest with the consumers of our products.

I am glad that our butter industry is going ahead as well as our cheese industry, and I believe that following the lead that Denmark has given us, we should depend more and more upon ourselves and not upon Government support. I am not saying this as a plea to relieve us from responsibility, but I notice from time to time a growing tendency to lean upon the Government, and I do not think that is a tendency in the right direction. We are largely makers of our own fortunes, individually and collectively, and we do not know what is in us until we are put to the test. Then we find that we can do a great many things that at one time we thought impossible. I have these thoughts largely for the younger generation. Those with the hoary heads have borne the burden and the care of the day and have brought us up to the proud position we occupy, and it now devolves upon the younger men to come forward and win greater laurels. I thank you for the very kind reception you have given me this afternoon. I am not a man of words, but I endeavour as far as possible to be a man of action. (Applause.)

The CHAIRMAN: The Minister of Agriculture has given us a practical address along practical lines, and a lot of good advice, and I know with our co-operation he will try to work out for us the interests of the dairying business.

J. H. MONRAD: Some of you may think it is threshing the straw over too much, but truth must be repeated. If I remember right, the first time I appeared before a Canadian Dairymen's Association they were discussing the very same subject that you are hammering at now, and I then mentioned the very first test association started in Denmark. Out of thirteen herds comprising three hundred cows, the cost of producing one pound of butter, averaged from 15 to 78 cents. That stirred up the old Danes. They are a little slow, but this stirred them up, and now Denmark has over 400 of these test associations. I will not go very much into the subject, because your Dairy Commissioner has published a bulletin giving the complete facts, and I have a report from the German Association, and also from Norway, so you see it is not only Danes. To speak the truth, I am getting tired talking about Denmark, and between you and me and the gatepost, the Yankees are getting tired of it too. The German Association started in 1877 with 20 members and 365 cows, at the end of the year in October, 1898, shows an average yield of 6,219 pounds of milk or 212 pounds of butter. In those countries they do not bother the farmers too much about protein and carbohydrates, and figuring how many pounds of each the cow should be fed, but they call a fodder unit one pound of mixed grain. They find that twelve pounds of turnips, five ponds of hay, one pounds of corn and 8/10 of oil meal corresponded to one pound of this mixture, and so they also call that a fodder unit, and you see how handy it is to make comparisons. One hundred fodder units produce 140 pounds of milk and 5.24 pounds of butter. At the end of the year 1903, five years later, the average yield was 7,605 pounds of milk or 279 pounds of butter, and 100 fodder units produced 172 pounds of milk or 6.29 pounds of butter. This represented an improvement in the average yield of a cow of 1,386 pounds of milk, or 67 pounds of butter, and every hundred fodder units produced last year 29 pounds of milk or 1.05 pounds of butter more than when the Association started.

Now, I ask you if that is worth while working for? I do not say that you can start off and do the same work, but these are facts of this one Association. In investigating the matter I find that some Associations have increased the yield enormously, but we find that they have used more food to produce the milk, and that is not a benefit. That shows they had gone too far in feeding too liberally, and they did not make it a paying business. The point I want to leave with you is this: that you get interested in it not only that you may get more milk, but you will also make a great improvement in the care and handling of the milk. Every place where they have milk testing associations the farmers take a greater interest in caring for the milk. In Denmark they pay by quality as well as by the fat test. They take special notice to the cans, and see that there is no brown cream at the bottom. They take notice whether the wagon is clean, then take a sample, and submit it to the curd test, and then make up a score and say: "Farmer Jones' milk scored 99, and Patterson's 84," and so on, and put that on the black board. They have carried on this kind of work in Denmark, and it has given splendid results. It is for you farmers to take up this work and don't you think it would pay you to take off your coat and work for this ideal, the testing of the individual cow. (Applause.)

A Member: At the factory at Culloden I took samples, and I was surprised at the results. I do not know whether the farmers will be able to get enough help to do this work. I think the test is something we can rely upon every time.

Mr. I. Steinhoff: When attending the Farmers' Institute some years ago in Eastern Ontario, I met a young man at one of our meetings, and he had the figures to show that after attending the Agricultural College for a year or two and learning how to use the Babcock test, in the course of three years, by weeding out the poor ones and keeping only the best, he increased the income from a herd of thirty cows by about one-third; and if that can be accomplished by one it surely can be accomplished by another.

I would like to say a word or two while the Minister of Agriculture is on the platform, as to whether we receive value for the money that is spent in instruction work. The present system is rather a new one, or an enlarged system that was introduced by the Hon. John Dryden some years ago. We believe it has worked out satisfactory. I presume ten thousand of that thirty thousand was spent in Western Ontario, and I think we have been well repaid for the expenditure by the increased price we have received. I believe one address that was delivered at this Association last year upon the question of butter making was fully worth the money expended. The instructors have gone upon the creamery wagons and visited the farms, and in that way we have done a great deal of good. I have had a long experience in handling creamery butter in Western Ontario, and I am satisfied that if we are going to improve the quality of our butter we must improve the cream. Our butter is largely improved by the cream being of better quality. I believe the assistance we have received from the Government has had a great deal to do with the improvement in the cheese industry. Our product now stands first in the British markets, and we cannot afford to look behind. We must keep on going ahead, and I think it would be better to go on and complete this system until every factory in this Province is receiving the benefit of this instruction work.

The Chairman: I would like to impress this upon the dairymen, that we should not have to go to the Government for money for instruction work, but we have to do it. Our dairy work is of such great importance to this country. Prof. Dean made the remark that in the state of Vermont they wondered how it was that we got money to boost along our dairying business here. I think we make good use of it, and we get value for the money we spend. I would like to see more independence among our dairymen. When I was a cheese-maker this question was brought up, and they state you are supposed to know you business, and if you want to know any mor you will have to pay it out of your own pocket. This is not the right way to look at it. I would like every patron of a factory to feel they have a share in this business.

Mr. Joseph Gibson delivered a short congratulatory address.

Mr. Reuben Smith, Mt. Elgin: I was born in 1842, and I attended the first cheese meeting ever convened in the county of Oxford, held in James

Harrison's house, where a few of us organized and arranged to draw our milk six miles and back. I think there is only one other man living who was there; that is Mr. Hyslop. I started with eight cows, and now I have sixty-four. I have tried all kinds of cows, big one and little ones, I remember that at that time old Mr. Rennie had a number of cows that were all mulies. He got up to ninety-nine of them, but he could not keep one hundred, for as soon as he got one hundred something happened to one of them. He made the first cheese that was taken to London, and it went to England, and there were some gold dollars in it because it sold for 25 cents a pound. Since that time we have been trying to improve on our breeds of cows, but I was just thinking to-day that I have not a cow that would give as much milk as these first ones I had. Mr. Rennie's cows all ran in the fields in the winter time. They were something in shape like a Holstein. I remember a man named Harris, who milked one of these cows. He milked a full pail, and then he picked his teeth with a goose-quill, and said, "I guess, old bossy, you are good for another pail, and he milked another one. (Applause.) I don't believe we have many of that kind to-day. I think Mr. Rice had one of the same kind at Guelph, but they are not very plentiful. If you get a cow of that kind you have got to stay with her and feed her or she will not be much good. If you have a nice snug little cow that can live on a straw stack and run into the fields and swamps and live on the underbrush during the summer and give a nice mess of milk, and when it comes dry weather she won't dry up, then you will have something that will make money.

The Chairman: I am sure that breed of cows that would live on straw in the winter time and underbrush in the summer time has been lost. I think we have just as good cows to-day as we ever had, and cows that will give us good value for the money expended in feeding. In fact I may go farther and say that we have better cows than we ever had.

A Member: I believe there is more credit to be given to the feed than to the breed. I have seen some cows that when it came a dry time they would go right down. I commence to feed my cows in the fall, and it pays.

The Chairman:. If you have a good cow you must expect to feed her well or she will not pay, and you should always have something ready to feed her when the grass dries up. I had one patron who had fifteen cows, and he was one of twenty on the route, and I have seen his cows produce 7,500 pounds of milk in seven months. One of his neighbors said he was putting water in the milk, and I tested the milk right there before them, and the milk we received from the man who was said to be putting water in his milk tested two-tenths per cent. butter fat more than the other one. His principle was never to let his cows go down; as soon as dry weather came on, he fed them.

Mr. Marter: I heard of a good, sharp Ontario farmer who went out to the Northwest and looked over the country, and then came back. He was asked by a neighbor "How do you like the country?" and he said, "You ought to have seen those beautiful plains as wide as the eye could reach, but I lost thousands of dollars there." "How was that?" "Because I did not have the cattle to eat the grass." And I think if a good many of the dairymen would go home and think that they had lost hundreds of dollars in the past in not having the right kind of a cow, and if they would follow up their thinking by getting the right kind of cow, it would be a good thing. The subject has been so fully discussed that I have not the slightest hesitation in saying that the majority of us agree that it would be a very good thing to have these testing associations. Do you not think it would be a good thing to show to the outside world that the Dairymen's Association of Western Ontario considers this is a very important subject, and that they should place themselves on record to that effect. The offer of the Dominion Government has been placed before you by the Dairy Commissioner. I heard an expression at the convention in Peterboro, which I thought was of value and that was, that if all the cows were as good as the best, and if all the milk supplied by the patrons was as good as the best, it would mean a great deal of profit in this industry.

The CHAIRMAN: Your idea that the Association should indorse what has been brought before them in the form of a resolution, is I think, a very good thing, and I have no doubt that such a resolution will be before the meeting.

A MEMBER: It is your idea that these individual tests will fill the bill?

The CHAIRMAN: Yes. If you have a cow giving you 20 pounds of milk and another 40 pounds, and if it is costing you just as much to feed the one as the other, then it will pay you to get rid of the cow that will only give you 20 pounds of milk.

Mr. FREEMAN: We all can tell the cow that is giving us the most milk.

The CHAIRMAN: Yes, but there are thousands of dairymen who still keep on the poor cows.

ADDRESSES OF WELCOME.

Mayor J. P. BOLES welcomed the convention in an eloquent speech, in which he quoted lines from the well-known "Cheese Poet."

The CHAIRMAN: I am sure that representing the Dairymen's Association as the president, I can say we appreciate the words of welcome that the mayor has just given in his address, and we can say that he ought to be proud of being mayor of the town of Ingersoll. We as dairymen look on Ingersoll as the centre of the cheese industry of the west, and Ingersoll has a name not only in Canada but also in the mother land, and when we quote cheese from this part of Canada we always quote Ingersoll cheese. Thanking you for your kind words of welcome and the effort put forth by your council and others for the comfort of this convention I tender you the thanks of the Dairymen's Association.

Dr. COLERIDGE, Ingersoll: I am sure that it affords me a great deal of pleasure to have the honor to cast upon me of welcoming the dairymen of Western Ontario to the good old town of Ingersoll. You have the freedom of our town. There was a time in my life when I used to spend my days down on the farm, and I used to take my turn at milking the cows night and morning. (Applause.) I wish to call your attention to the fact that we feel honored here in Ingersoll to have your convention held in our town. You have returned to your home, and I hope you will feel that you are made welcome, and that you are put up in as hospitable a manner as any town could put you up anywhere in the Dominion. We are proud of the statement made by his worship the mayor that we are fifth in the export towns in the Dominion of Canada.

My friend, Mr. Ruddick, said he had been in New Zealand and in all parts of the globe, and I have no doubt he will tell you that no matter where he went the good old town of Ingersoll had a name and a fame.

I welcome you on behalf of the institutions of our town. We ask you to go, not only to the dairy portion of the town, but we ask you to go and visit the Ingersoll Packing Company, where you will see 2,800 hogs killed in a day, and we would like you to compare that with the time when we spent half a day getting ready to kill hogs, and when it took two or three days to kill a few hogs on the farm.

CONSTRUCTION OF CHEESE CURING-ROOMS.

By J. A. Ruddick, Dairy Commissioner, Ottawa.

As an old Oxford boy it gives me pleasure again to be here to-night (applause), and I can re-echo the sentiments that have been already expressed. I could not help but think of the time some thirty-five or forty years ago when I used to walk into town, and the small boys in the town used to pass uncomplimentary remarks about my personal appearance, and things like that, and when I was at a safe distance from them I would talk back to them in my own way. I am reminded again how long ago that was, by speaking with one of my old chums with whom I used to go "hooking" water-melons on the old river road. He is one of your worthy aldermen. I shook hands with him on the platform and he did not recognize me.

It has been my privilege to travel somewhat extensively. Since I left here I have seen a good deal of the agricultural world. I do not say this in order to say something nice, but I have always contended that I have never seen any fairer domain than that which lies in this part of Canada, and particularly in this county of Oxford. I have seen land that produced more goods, and that are better handled and better cultivated, but I do not think there is any land better suited for the work than the land you occupy. (Applause.)

I have to speak to you to-night for a short time on some points in connection with the creamery cold storage and the construction of cheese curing rooms. Mr. Ruddick then spoke to the same effect as in the address delivered by him on a similar topic at the Eastern Dairymen's Association, and reported in its proceedings.

THE COW: BREED, SELECTION, AND FEED.

By G. L. McKay, Ames, Iowa.

I can assure you that it affords me no little pleasure to meet with you in my native county, or I might say my native town, as my boyhood days were spent here.

If I have any fault to find with some of the Canadian people, it is that they do not proclaim themselves Canadians at all times. When I meet a Canadian in a foreign country, and he calls himself simply an American, I think there is something wrong with that man. If, on the other hand, he tells me that he is a native of Ontario, from the banner county and from the best town in that county, I know at once that he is an Ingersoll man.

Very few people have any conception of the magnitude of this country that we call Canada. A few years ago some thought that beyond the 49th parallel was a frozen and barren country. Why this thought existed I do not know, as Winnipeg is no farther north than London, nor Edmonton farther than Berlin. I had the pleasure last autumn of spending eighteen days in northwest Canada, accompanied by twenty-five western editors. We travelled nearly 5,000 miles by rail, and nearly 400 by carriages, and we only saw a small portion of that vast country, yet we were travelling practically all the time. I slept eighteen nights in the one berth. You should have seen the astonishment of our American friends after we had travelled a few days through that wonderful wheat belt. In fact we were ready to believe anything in the way of crop statistics. Wheat, wheat everywhere.

A common expression was that wheat ran 50 bushels to the acre. After we were out a few days, if they had come into our car and told us that they had a field of wheat that yielded 75 bushels per acre, we would all have accepted it as a fact. There is not a doubt in my mind that the Northwest Canada is the greatest short grain country in the world. Canada now holds tenth place as a wheat country.

W. E. Curtiss, the famous correspondent and compiler of statistics, has predicted that within the next fifty years, Canada will lead the world in production of wheat. In connection with this, you have the assurance of two great railroads spanning the country from ocean to ocean and a good prospect for a third, as the Canadian Northern is fast pushing its way from coast to coast. What is the significance, of the opening up of this vast country, to the Ontario farmer? It means that he will have to do more intense farming. You cannot otherwise compete successfully with the Northwest farmer, with his cheap land. I met a man on the train a few years ago who owned a large ranch at Medicine Hat. He said that he could produce a two year old steer for $7. This animal could be shipped to Ontario and possibly outsell you at your own door.

The same cool weather that is favorable to growth of wheat is also favorable to dairying and live stock, and sometime in the far distant future we will undoubtedly see a line of steamers running from the Hudson Bay to the leading markets of the world. You will possibly see large warehouses for grain and cold storage buildings for butter and cheese erected, which will prove a bananza for the Northwest people. It will also be the means of sending their cattle direct to the English market.

Ontario has no reason to fear competition in dairying, as there is no country in the world that is better adapted for this line of work. Dairying, however, is very much like water, it becomes purer and better from agitation, and if permitted to stand still, is somewhat inclined to become stagnant. Looking backward over the advancement that has been made in dairying during the last twenty or thirty years, and comparing it with the progress that has been made along other lines of agricultural pursuits, we must confess that we have not advanced as fast as we should, especially from the producers' standpoint. Thirty years ago it took 211 hours of labor to produce 100 bushels of barley. To-day it takes about nine hours. It took 228 hours of labor to produce 50 bushels of shelled corn, and to-day it takes about one-third of that time. One hundred bushels of oats take about one-tenth the labor that it took thirty years ago. It takes about one-twentieth of the time to produce a bushel of wheat that it did thirty years ago. All this is due to the introduction of modern machinery and the scientific methods of farming.

There is no line of agricultural work that pays better than dairying if done in an intelligent manner. Dairying takes practically no fertility from the soil. A ton of wheat removes about $7 worth of fertilizing material, while a ton of butter removes only 50 cents worth of these ingredients. At the same time a ton of wheat brings a market price of $20 or $22, while a ton of butter sells for $400. In other words, the man who is running a dairy is practically selling sunshine, air and rain and very little of the latter, while the grain farmer is disposing of the elements of fertility that sooner or later must be returned to the soil either in the form of barn-yard manure or commercial fertilizers, if we wish to leave a heritage to our children.

The lack of imagination or of original ideas is a great drawback to men in all lines of business. Often you find in men an absolute incapacity to realize an unfamiliar situation; to grasp conditions which are not immediately visible; to recognize facts which to others are a plain and patent element in their life. This is quite apparent in the dairy business. Go into almost any section of the country and study the conditions in the various creameries, and you will find men there who are keeping herds that produce possibly 300 pounds of butter and up, per cow. In the same community and on identically the same kind of land, you will find others who have herds that do not pay for their keep.

The great question is how to arouse the negligent dairymen to action, to see their own opportunities. The frequent holding of institutes and picnics, thus bringing the creamerymen and creamery owners in direct contact with the patrons, all have their beneficial effects. Some years ago I visited the farm of the late E. D. Tillson, of this county, and inspected his famous herd of Holsteins and Holstein grades. Forty of his cows had made an average of 450 pounds of butter per cow. This gentleman informed me that it was almost impossible for him to convince his neighbors of the necessity of keeping good cows and caring for them in such a manner as to produce the best possible results, notwithstanding the great records made by his cows.

Two years ago I had a letter from ex-Governor Hoard, of Wisconsin, stating that his herd of thirty Guernsey cows gave him returns from the creamery alone, for butter fat sold within a year, within a fraction of $70 per cow during that year; in addition his skim milk netted him from 30 to 50 cents per hundred. This shows the result of intelligence.

As Dr. J. G. Holland said:

> "We rise by the things that are under our feet,
> By what we have mastered of good and gain,
> By the pride deposed and passion slain,
> And the vanquished ills that we hourly meet."

It is not necessary for me to state that the cow is a more economical producer than the ox, as this has been thoroughly demonstrated, especially in the densely populated portions of Europe where land is worth $400 or $500 per acre. We not only find them dairying successfully, but in some cases we find them buying American grain for their cows, and meeting us in competition with dairy products in the English market. Two of the greatest friends that man possesses are the dog and the cow. A man may fall so low that friends and relatives will desert him, but his dog will stand by him no matter how much he abuses him, and he has been known to starve himself when protecting the dead body of his master. The cow in the same way, no matter how poorly she is fed or how roughly she is treated, will still yield milk and cream. She is the only animal that works night and day. During the day she gathers food, and at night she converts it into articles of diet and usefulness for mankind.

This wonderful moving, living, breathing, active piece of machinery; this general utility animal who has done so much and received so little at our hands; she who has lifted the mortgages from so many homes and adorned them with all of the beauties of mechanical art and added the comforts that come only with genius and wealth—she is the peer of all animals.

As my friend Marple, or Missouri, said, "When we awake in the morning we behold the walls on which the plaster has been held by her hair. We fasten our clothes with buttons and we comb our hair with a comb made from her horns. We put on our feet a pair of shoes made from her skin, and as we enter the dining room and sit down to a tempting breakfast we find she has provided us with a plate of butter, a piece of cheese, a cup of milk, a pitcher of cream for our coffee, a plate of cream biscuit, a smoking beefsteak, while for our dinner we have soup made from her tail, delicious roast beef, pumpkin pie made with her cream, sweetened with sugar that was whitened with her blood, and made out of pumpkins grown on land fertilized with her bones; and yet we but half comprehend how valuable she is to the human race."

Some woman said, "Man is what woman has made him." Whether this is true or not we can truly say, the cow is what man has made her through breeding, feeding, and selecting. As we trace her origin we finally go back to the wild cattle, or the cattle in their native state. By inbreeding and selecting we have at the present time many noted breeds of cattle. It would be useless for me to attempt to tell you which one of these breeds you should take, as this would be a good deal like selecting a wife; it depends entirely upon what is desired.

Study the noted breeds of the Jerseys and Guernseys, and we find their origin practically the same. Both as far as is known were bred from Normandy and Brittany stock. The Normandy blood undoubtedly predominated in Guernseys. The environment had much to do with their characteristics. These islands were not noted for the luxuriance of their native grasses. The productiveness of the soil at the present time is largely due to the number of cows constantly kept on the island. It is estimated that one cow is kept for every acre of grass land. One unchangable law is that cattle can be sold off the island but none can ever be brought in. This restriction is rigid so as to keep their breed pure. The cattle are cared for mostly by women, consequently, they are not subject to harsh treatment. The man who is not especially adapted for dairying would undoubtedly make a failure of these breeds of cattle. When we cross over to Holland we find the home of the noted Holstein cattle. These differ from the Jerseys and Guernseys in many ways. They have undoubtedly been bred for the production of butter and cheese, consequently, they give a large flow of milk. This is possibly the purest breed of cattle that we have on record. We find on looking up the history of the famous Ayrshire cow that she was improved by the introduction of Holstein blood. We find also that Holstein blood was used in building up the Shorthorn breed. The Holstein is a large, rangy cow, partaking largely of the conditions of her country, as there is an abundance of luxuriant grass and herbage, the soil being exceedingly rich and well watered. She is adapted for consuming a large amount of coarse fodder, and the succulence of the vegetation has rsulted in a very full milk flow, but the milk is low in fat content.

Originally the Ayrshire cattle, natives of Ayr, Scotland, were mostly black in color with white stripes. They were rather small and ill-shaped and gave a small flow of milk. By infusion of other blood the Ayrshire has become one of the leading breeds of dairy cattle. Of late it would seem that some of the breeders of Ayrshire have been devoting too much attention to show cattle. The result is a flat udder with a very short teat, which is not desirable for dairying. A great deal of time in some parts of the country has been spent during the past fifteen or twenty years in trying to improve dairy cattle by crossing with beef animals. The result is that we have a lot of cows throughout the country that are neither good beef nor dairy types, but simply "scrubs." It is true we have some excellent milkers among some of the beef types, but it has not been demonstrated that such cattle can be successfully bred.

About thirty years ago Goldsmith Maid trotted a mile in 2.27, and it was heralded throughout the press as a great wonder. To-day we find horses trotting in 2.10 and 2.15 at some of our county fairs. What has brought about this wonderful change? It is due to specializing in breeding. Do you suppose for a moment that by crossing Percheron, Clydes, and Shires with trotting stock, we could have produced our Dan Patch, Lou Dillon, Nancy Hanks, and many others? It is said that Dan Patch eats four quarts of oats three times a day in connection with other foods and paces a mile in 1.55¼. You might feed most any of your horses four bushels of oats per day and they could not pace a mile in two minutes, as they have not been bred along these lines. America leads the world in the number of fast trotting horses, and there is no reason why we should not do the same with dairy stock if the same care is exercised in selecting and breeding.

A Guernsey cow in Wisconsin has produced over 1,000 pounds of butter during the past year. This shows what can be done by special breeding. I do not mean by this that everybody should invest in thoroughbred stock when building up a herd, as this is a luxury usually intended for the rich, or men who have special means of advertising. Where a full-blooded sire is used with a grade, the first cross is more than a half; the second cross would be 75 per cent. and the third 87½ per cent., and the fifth would certainly be a full blood. In selecting a sire it is best to get one from a good milking strain; not only the parents but the grandparents should be considered.

There has been a lot of discussion in late years about the merits of the so-called dual purpose cow and the special dairy type. My state is one of the strongest dual purpose cow states of any in the Union. This is due to the fact that corn is our principal crop, consequently, beef production is a very assential thing. Notwithstanding that we make more butter than any State in the Union, dairying has been carried on somewhat as a side issue. So the cow that raises a good calf and gives a large flow of milk is the one most favored by the majority of our farmers. The whole question of dual purpose and special dairy type depends on locality. The dairy breeds are more popular in our State now than they have been for ten years. I presume the reason is that many persons trying to breed the so-called dual purpose cow have produced animals that did not belong to either type.

There is possibly more money to be made in exclusive dairying than in any other line of agricultural persuit, but every man is not intended for a dairyman. The man who makes a success in any line of work must have a liking for his business.

Two years ago I visited the famous herd of Jerseys owned by Mr. Ladd, the multi-millionaire of Portland, Oregon. Three of his cows were leaders at the World's Fair. It is Mr. Ladd's ambition to own the best herd of dairy cattle in the world. I had the pleasure of visiting his estate and herds, accompanied by himself. He has about 100 Jersey and Guernsey cows, mostly of the former breed. What surprised me the most was the detailed record kept of every cow, and the general knowledge that Mr. Ladd possessed concerning each individual cow, notwithstanding his busy life as a successful banker. He keeps in close touch with every detail of the farm. When walking up and down the aisles of his magnificent dairy barn, he gave me a detailed record of each cow, from memory, therefore I was not surprised to see Ladd's herd come to the front at St. Louis, as he is thoroughly in love with his business.

I have not time to take up the question of feeding, but I will give you the method pursued by one of the most successful, practical dairyman in our State. He does not select any one special breed of cattle. I refer to ex-State Dairy Commissioner Norton, of Creso, Ia. He had a herd of thirty cows that made on an average 380 pounds of butter per cow for the year. They were of many breeds, but all had dairy characteristics. Mr. Norton, it is said, started in the dairy business twenty-five or thirty years ago, with two cows and forty acres of land. To-day he owns the finest home in his county, and possibly the best barn of any man in our state. In connection with this, he owns hundreds of acres of our best land. His barns and house have electric lights, and his separator and churn are run by an electric motor. He was one of the first men in our State to use a hand separator. He manufactures his own butter and has a special market for the same. He endeavors to raise all his calves, which later on he sells for veal, therefore his skim milk nets him twenty-five or thirty cents per hundred. He has his cows calve in the fall as much as possible, and he is a strong believer in protecting them from inclement weather. They are even watered in the barn. In fact he is a believer in forcing a cow to drink more water than she really cares for. After the cows drink all they want he mixes the grain feed with the water in bottom of boxes. He thoroughly believes that a milch cow, to do her best, should be in such good condition that she could be sold to the butcher at any time for beef.

His principal feeds are ground corn, bran, clover hay, and ensilage, when he can get them. He regulates the quantity according to his own judgment of the needs of each individual cow, feeding as near a balanced ration as possible. Mr. Norton tells that two years ago when building his magnificent barn, a farmer owed him $2,500 which he had promised to pay at that time, but was unable to do so, and Mr. Norton borrowed the same amount from the local bank. This sum he has paid off from proceeds of dairy and farm, and the other farmer who did not have time to milk cows, has not been able to make his payment yet. Now what Mr. Norton has done, others can do.

When cows are on grass during the month of June or the latter part of May, there is never any question about dairying paying because they have an abundance of succulent food, or what might be termed a balanced ration, in the grass they eat. Ensilage fed during the winter months approaches nearer grass or summer conditions than most any other food, owing to its succulent nature. For this reason, if no other, a good silo should be found on every well regulated farm. It is true that we have many cows that give a large flow of milk for a short period. This kind of a cow is not profitable, and is likely to deceive the owner, as a dairyman usually remembers her as she is at her best. When a monthly test or yearly record is kept of individual cows, no such difficulty is experienced. Undoubtedly we have hundreds of cows in the country that are not producing more than half or two-thirds what they should, owing to lack of proper treatment. All animals, man included, will sooner or later adjust themselves to their environment. We have hundreds of bright boys and girls in our cities who are mere waifs, but under different surroundings would make useful citizens.

A few years ago when visiting the Isle of Man, that rocky little country surrounded by the sea, I was forcibly reminded of the effects environment had on animals. The sheep in that place were not more than one-third as large as they are here. Grass was very scarce and the little sheep seemed to be especially adapted for climbing over the rocks and hunting their living. The same is true of stock of any kind. Some of our finest breeds would not retain their characteristics long if not properly housed or compelled to seek their own living.

When visiting some of the leading dairy farms in various parts of this and others countries, and studying their methods of feeding, I have come to the conclusion that the average dairyman does not feed his cows enough. It takes sixty per cent. to sustain animal life, and we get our profits largely from the extra forty per cent. fed. Irregular feeding and cold barns are serious drawbacks. Turning cows out to drink ice cold water is not conducive to profitable dairying, as it takes extra feed to supply energy and keep up animal heat. It is not always the man who has the best cows that makes the greatest success of dairying. Neither is it the man with the best gun that always does the best shooting. There are two essential qualities necessary for both. A good marksman must have a well trained eye and good nerve, while the successful dairyman must have a good knowledge of dairying and enough energy to apply that knowledge. So it is largely a question of the man behind the gun in both cases.

ADDRESS.

By Donald Sutherland, M.P.P., Ingersoll.

I have been engaged in agriculture all my life, but I cannot lay claim to being much of a dairyman. I cannot get out of my mind a picture that was made by some of the previous speakers who spoke of these large herds. I fully appreciate the importance of the dairy industry here in Canada. It is no doubt the chief industry to-day in the Dominion. It stands pre-eminent in that respect. Mr. Ruddick said to you that he had been over a great deal of the world, and that conditions here are as favorable as they are in any part of the world, and I believe it to be the case with our atmospheric conditions and the fertility of our soil and the purity of our air. There is nothing to prevent us having a good article of butter and cheese. There are many here to-night who remember when the first cheese factory was stablished here in Canada. It is only thirty-nine years since the first meeting of the Western Dairymen's Association took place in this town of Ingersoll. We are proud of the reputation this district has obtained throughout the British Empire, and we have good reason to profit by the addresses that have been delivered here this afternoon and evening. But we should ask ourselves the question, "Are we doing as well as we should do?" It is not long ago since much of the land here was growing rough and coarse grass, and to-day you find sweet and nutritious grass growing. Now, since the land has been drained, our stock has got nothing but the purest of spring water, and these things have helped considerably towards the production of the articles which are being manufactured. Mr. Monrad urged upon us the necessity of co-operation in this industry. I wish to call attention to the fact that the dairy industry in Canada is not in the flourishing condition that it should be, and that the condition of agriculture here is not what we would like to see. We have a large territory in this country that is practically undeveloped. Just try to realize the expanse of that great sweep of territory, stretching from ocean to ocean, a distance of 4,000 miles, possessing everything that man could desire and with promises of a mighty future. I was looking over the Trade and Navigation Returns, and I find that during the past two years we have not been progressing, but have been going backward. I find that during these two years our exports have decreased by $34,995,000, and that $28,000,000 of this decrease has been in agricultural products. Our exports for this past year have been $190,000,000, while two years ago they were $225,000,000, and in butter and cheese, which is the chief industry of Canada to-day, we find that for the past year our exports have been $26,291,000, and last year they were $28,960,000. Two years ago they were $31,735,000. This shows a decrease of about $6,000,000 during that time.

There is another thing I have referred to upon different occasions, and that is a matter revealed to us by the census returns. The great problem that confronts the people of this country to-day is the migration from the country to the cities and towns; and how are you going to prevent that? You may talk about the vastness of our Western country, and the immense exports we may have from that country in the near future, but old Ontario must look after old Ontario. What I wish to emphasize is that this migration that has been going on is beginning to have an effect, and if you drive through Western Ontario as I have done the past two or three years, you will be struck with the number of farms that are being seeded down and turned to grass and used for grazing purposes. Some of the speakers were impressing upon us the necessity of weighing and testing the milk day by day. One of the gentlemen in the audience called attention to the fact that it was almost impossible to do so on account of the difficulty of obtaining sufficient help. Is there a farmer present here to-night who could say he is farming as he would like to? He is not doing so, from the fact that it is impossible for him to secure the necessary help to enable him to do his work as he would like to. This gentleman pointed out that he could tell by the amount of milk a cow was giving whether it was a good one or not, without an exact test being made, and I could not help but feel that was quite true. Labor may be much cheaper in Denmark than it is here, but with our present conditions we have to see how we can get along with as little labor as possible. I wish to say that I believe there are several reasons for this present condition of affairs. You might point out that there are good and splendid opportunities on the farm for young men, and how foolish it is to go into the cities, and how much better it would be for them to stay at home. I am not going to say anything in regard to that, but I would just point out to you that young men on the farm are just as wide-awake and just alive to the main chance as any young man you will find anywhere else, and we have an illustration of that in some of the speakers present. Mr. Ruddick and Prof. McKay have gone out in the world as country boys from this country, and have made their way, and now stand out prominent in the calling to which they have devoted their energies, and you will find a similar state of affairs in all professional and business concerns. The best business blood in the cities comes from the country places.

I want to point out what I believe is largely responsible for the present condition of affairs. You may show how necessary it is for a person engaged in dairying to improve his herd and to increase his receipts, but almost every other calling except those engaged in agriculture have some organization by which they are endeavoring to fix the price and to restrict the amount that is manufactured and to control prices. It is shown every day in the Province of Ontario that this is the case. We have good illustration of it in this town of Ingersoll, where two mills close up year after year because the owners receive a larger amount of profit than they would have if they were in operation. But you may rest assured that there is going to be a reaction, and that this country is not going to prosper under present conditions. Just about a year ago the Manufacturers' Association of the Dominion of Canada sent an enormous delegation of 278 to Great Britain, and they have visited all the manufacturing centres throughout the Old Land and endeavored to impress upon them how necessary it was to continue the present condition of affairs that we have in this Dominion at the present time. There was an agitation on foot over there that looked a little dangerous to them if closer commercial relations or more freedom of trade came. They took time by the forelock and sent over a deputation. During the last few months the Dominion Government appointed a Commission to make a revision of the tariff, and it is quite the proper thing to do, as we have men who now have a protective tariff of from 25 to 35 per cent., and they are clamoring for more, and taking every advantage of the people of Canada. They are getting things in such a condition that they are able to receive from us the last cent that is possible.

I want to refer to another matter we have heard to-day, and we will hear to-morrow and next day from quite a number of these men who are engaged in connection with our educational institutions. I refer to our Agricultural College and Experimental Farms. A statement was made by Prof. Dean in reference to the dairy herd, that one of their best cows made a total profit of something like $40, and that was held out as an illustration of the possibilities that could be secured from a good cow. I want to refer to the fact that they have established in connection with the Agricultural Farm an experimental dairy, and I noticed that although they receive a very large amount for their milk—I think it is four cents per quart—which they supplied to the institution and otherwise, they have not been able to demonstrate that they could carry on dairying profitably. I noticed that in 1902 there was a loss of $5,298.98, in 1903 there was a loss of $4,230, in 1904 a loss of $3,727, and leaving out all the expenses in connection with instruction and labor, that there was a loss of $1,700. This same thing has been going on for a number of years in connection with the Experimental Farm at Guelph. I have yet failed to see where they have been able to demonstrate that farming can be carried on profitably. I wish to point out that this report issued by the Agricultural College does not include anything in connection with the College or with the Dairy departments, or with the Experiment plot. It is confined to the Agricultural Farm alone, and that they have for the past five years shown a deficiency of from $4,000 to $12,000, $4,000 in 1900, $4,000 in 1902, $6,000 in 1903, and $12,690 in 1904. The report also said that there was a large quantity of hay supplied to the dairy herd which was not taken into account in the financial statement, so that would make it look all the worse for the Experimental Dairy. I wish to point out to you the fact that they have made some experiments at the College farm, and they have endeavored to show the cost of producing beef for the British market. During 1902 I see that there were sixteen cattle fed. They were put in two lots and fed for 119 days on different rations; one lot was confined to ensilage, roots and hay, and the others to roots, meal, and hay, and in the one case the cost of production was a trifle over 8 cents a pound, and in the other a fraction over 5 cents per pound. In 1903 the experiment was still continued with sixteen more cattle for 160 days and for 117 days. For eight steers it cost 10½ cents per pound to produce a pound of beef, and for the other eight steers it cost 12¾ cents per pound to produce a pound of beef. For 1904 the result of the tests were so unsatisfactory that they decided not to publish them until they were compared with the test made during the coming winter. I am not saying a word to disparage the work that is being done at Guelph. There is no one who realizes the importance of thoroughly understanding the work more than I do. I just wish to point out that I have been engaged in the production of beef for the British market all my life, and I am beginning to think I must be a philanthropist, because I have not been able to receive more than half what it costs to produce beef according to the cost as shown by this experiment at the College.

This, I contend, is one reason why you will find so many of the youths of our country entering into the professions and engaging in business, where the prices are nearer to leaving a fair margin of profit. I am not saying things here with which everybody will agree, but I hope there will be a full discussion of this question. I feel satisfied that there is no business for which this country is better adapted than the production of cheese and butter. I believe we will be compelled to go into this industry in order to live here as we would like to. Land is expensive, and there is a lot of capital expended in a well equipped farm in this part of the country. I wish to point out to you that the exports of the different branches of industry in this Dominion are as follows:—

Minerals exported	$31,000,000
Fisheries	11,000,000
Manufactured goods	22,000,000
Dairying, animals, and agricultural products	93,000,000

So that you see we are engaged in a very important industry. I am glad to see this large audience listening to the addresses, and I feel satisfied that much good will be attained in this district before this Convention comes to a close.

Prof. Dean: I regret that the President of the Ontario Agricultural College is not here at the present time, to reply to the rather severe reflection which has been made by the member for South Oxford. I have not the pleasure of knowing Mr. Sutherland personally, but so far as my own department goes I should like to make a word of explanation. I would like to ask him if he has looked into the fact that during four months of the year we have a special course for cheese and butter makers—a school? During these four months we pay salaries of $600 per month to these instructors, and that will make somewhere between $2,000 and $2,500 paid to these men who are specialists and who come there for the special purpose of instructing. And I should like to ask him, in all candor, if he thinks that it is fair that the Dairy department should pay the salaries of these men? I said to my instructors at the beginning of the year 1905 that I believed the time was coming when the people of this country will expect the Agricultural College to pay for itself, after making fair allowance for instructing and experimental work, and I said I expected that during 1905 we should be able to reduce the expenses of the Dairy department considerably. I have a statement from the Bursar of the College during 1905 showing we were able to reduce the net expenses by $2,000. (Applause.) I think we did just as good work in 1905 as we did in the previous year, and I said to my men that I expect this year we will do better still, "I expect you to see that no milk or butter or cheese is wasted, and we will be able to reduce the expenditure still further." I would like to say that I have always said we will run the Dairy department on business principles, and if Mr. Sutherland has ever had any experience with an agricultural college he will know that it is a very hard thing to do. In talking this thing over with the Minister of Agriculture he said he was surprised at the number of people who were expecting to get something for nothing from the Agricultural College. Who is responsible for that sort of thing? It is the people of this country, and until they become educated to the fact that they are not supposed to get something for nothing from the Government or anybody else, it is a very difficult thing for a man in charge of a department to make it pay or to run it upon business principles. The people of this country are to blame for that sort of thing. So far as my own department is concerned I welcome the criticism of Mr. Sutherland. I believe it is a fair criticism, but I would like to say that he made no allowance whatever for the special teachers we bring there, nor did he make any allowance for the experimental work which everybody knows is expensive. I think I am entitled to this explanation at the present time. I thank the honorable gentleman for calling attention to this matter, because, as I said, I believe the time is coming when the people of this country will require that Government institutions should be run on business principles. (Applause.)

Mr. SUTHERLAND: Prof. Dean has asked that I answer a question, and I may say I am more than delighted to have stirred up a little feeling in connection with the meeting. Every positive has a negative. I was beginning to think possibly that things were going along a little too smoothly. The question he asked is very easy to answer. I made my statement here, and I made it fairly. I said deducting the salaries that were paid in connection with the experimental dairy it left a deficiency of $2,649 in 1902, and $1,256 in 1903, and $1,737 in 1904. Now, I left out the expense of instruction. Including that, there was a much larger deficit. He also referred to the fact that some people expected something for nothing in connection with the Agricultural College. I would just like to ask Prof. Dean if they did not charge the Agricultural College four cents per quart for milk supplied to that institution?

Prof. DEAN: While it is charged, no money is paid. We furnished to the Ontario Agricultural College nearly $1,500 worth of cream, for which no cash was paid. And if you look at the figures you will find the Dairy Department did not come far from paying expenses.

Mr. SUTHERLAND: I can only say I am very happy to hear his explanation. If it is charged to that institution, and it is not paid, I do not see why it appears in the reports in connection with the financial statement in connection with the Agricultural College.

Prof. DEAN: If you will look at the bottom of the Bursar's statement you will see "No allowance for milk and cream supplied to the College." and if you look at that closely the amount of milk and cream furnished amounts to $1,500. (Applause.)

Mr. SUTHERLAND: I am very happy to hear that explanation, and that will leave it practically paying expenses, and I presume that is where you will find a large number of people engaged in dairying throughout this Province at the present time. Do not misunderstand me, and think I have been criticising this department through any improper motive. I was at a loss to understand how, with all the facilities at their disposal, and with all the skill which they practise, they were unable to make a better showing than they did. If that was the case, how could we rely on articles that were published in connection with that institution? I do not wish to take up any more time, and I hope to-morrow to have Prof. Creelman explain the other matters as well. I hope some explanation will be made regarding the feeding of steers, because if the report is true some of us had better go out of the business.

INSTRUCTION IN CHEESE FACTORIES, WESTERN ONTARIO, 1905.

BY GEO. H. BARR, CHIEF INSTRUCTOR.

The work of instruction among the cheese factories in Western Ontario was carried on along similar lines to that of 1904.

In arranging the various groups of factories, along with the Executive Committee of the Association, we thought it in the interest of the cheese industry to recommend to The Ontario Department of Agriculture that one more Instructor be appointed than in 1904.

This they willingly did, giving us ten instructors. Seven of these were engaged to work exclusively among the cheese factories, two among the creameries, and one in both cheese factories and creameries in the Kincardine section.

The following table gives the instructor in each group and a statement of his work for the season:

Name of Group.	Instructor.	No. factories.	Visited regularly.	No. visits.	No. curd tests.	No. lact. tests.	No. Babcock tests.	No. patrons visited.	Expenditure at factories for repairs, etc.
Ingersoll	J. H. Scott	24	24	121	359	4,426	89	77	$10,150 00
Woodstock	F. Herns	26	23	119	358	4,196	62	122	9,670 00
Simcoe	C. C. Travis	25	23	126	134	5,469	422	22	1,630 00
Brantford	R. H. Green	23	20	115	267	6,648	59	77	7,076 00
Stratford	Alex. McKay......	26	23	132	1,002	4,191	167	141	1,937 00
Listowel.............	J. R. Burgess	26	18	113	822	5,265	35	109	1,350 00
London	Frank Boyes.......	28	23	118	274	3,743	124	24	1,950 00
Kincardine	E. N. Hart	10	7	44	212	2,443	45	18	1,270 00
Outside factories	G. H. Barr	29	10	17	......	879	67	....	....
	Total	217	171	905	2,628	37,310	1,070	590	$35,033 00

I am pleased to say that the work in 1905 has been the most satisfactory since the present system of instruction was adopted. The makers and the instructors are beginning to know one another better, and the patrons are becoming more interested in the work. They are realizing more fully the necessity of delivering clean, sweet milk, if the quality of the cheese is going to be fine.

I regret that many of the factory men and makers will not allow the instructors to visit their patrons. I firmly believe that the more the patrons know about our work the better it will be for the factory. In cases where the factory men went out with the instructors and called upon the patrons, not one here and there, but on everyone along the road, good results were obtained.

To reach the patrons who are not taking proper care of the milk is the greatest problem to solve in our work. I believe the only effective way is to drive to their farms and endeavor to point out better methods. Very few, when approached in the proper way, will resent this information. In most cases patrons are quite as intelligent and anxious to improve their methods as are the makers and factory men. Let us make an honest effort to get in closer touch with the producers of the milk.

There is still a great quantity of tainted and over-ripe milk sent to the factories. Over-ripe milk is caused by keeping it over night at too high a temperature. Cooling the night's milk to 60 degrees immediately after milking will keep it sweet over night. Taints in milk are caused by unclean milking, keeping the milk in bad surroundings, and using rusty and unclean cans.

Vigorous steps are being taken at some factories to get rid of rusty cans, with a marked improvement in the quality of the milk, especially where the bitter flavor has been. I regret that there has been a larger number of patrons adulterating their milk by adding water and taking off cream than in previous years. I sincerely hope this practice will be discontinued; it is a serious reflection on the honesty of our farmers.

Taking the season as a whole the quality of the cheese has been better than ever before. We had fewer hard, dry cheese during the summer months, the reason, no doubt, being due largely to the cheese being shipped from the factories earlier than in former years, and when the makers knew the cheese would go out promptly they did not use so much salt.

Nevertheless, during about ten days' hot weather in July a considerable number of dry cheese were made. I do not think there is any need for this if the makers will handle the curds properly, even if the milk does work a little fast. Set the milk at 82 or 83 degrees, using from ½ oz. to 1 oz. of extract per 1,000 pounds of milk extra, cut the curd very fine and dip with a small acid. This method need never be resorted to except in extremely hot weather, as the loss is very great.

Each year the makers are adopting more uniform methods. There is very little difference, indeed, in the way the curds are handled in all the factories. There is little to say that is new regarding the method of making the cheese. The main points to observe are: Careful work in selecting the milk at the weigh stand. As our patrons become better informed regarding the proper care of the milk, the maker must do closer work in rejecting tainted or over-ripe milk.

Careful cooking and thoroughly cooking the curd is absolutely necessary to make a smooth, meaty cheese. Stirring the curd dry in the sink has been carried to excess in some cases, still it is very much safer to stir too dry than not stir enough. The intelligent use of pasteurized starters in the factories has done much to shorten the cheese-makers' hours and make more uniform cheese. Every cheese-maker must know how to make and use a starter properly if he is going to make the finest cheese.

The acidimeter is being used very generally, and is considered a great help by most makers. I think an acidimeter is absolutely necessary to carry along a first-class starter. Of course some makers are more careful about details, with the result that they have finer cheese than those who are inclined to be careless.

The finish of the cheese is gradually improving, but there are still too many makers careless in this respect. Only one case was reported to me where green heading had been used in the boxes, but many complaints were made by the buyers about the way the cheese were boxed. In some cases the cheese are too high for the boxes, in others the boxes are too high for the cheese.

All the factories are not using stensils for putting on the weights. I think our buyers should refuse to accept cheese with weights put on with a pencil. Carelessness in boxing does much to injure the reputation of our cheese.

Considerable repairing has been done to the buildings, but not nearly as much as in 1904. Where curing rooms have been put up with an ice chamber, on the plan of the Dominion Government cool curing rooms, they have given the best of satisfaction, and it is very plan if we are going to have smooth, meaty cheese shipped from the factories during the summer the temperature of the curing room must never go above 62 degrees.

I should like very much to see our makers pay more attention to their personal appearance while in the factories. Everyone should wear an apron and keep themselves clean and tidy looking. There is also great room for improvement in the surroundings of our cheese factories; there is too much rubbish lying around, and weeds allowed to grow and go to seed. We will never reach the ideal state in manufacturing dairy products till every factory and creamery is a model of cleanliness inside, and an object lesson in attractiveness in its surroundings.

During the year only eight patrons' meetings were held, six at cheese factories and two at creameries, the attendance ranging from twelve to four hundred.

Since last convention I have attended twenty-five annual meetings, with an attendance of 1,166 people. I believe attending the annual meetings is the best way to reach the patrons. During November seven district meetings were held for cheese-makers and factory owners to discuss the season's work and arrange for the work of 1906. These meetings are very useful, as local conditions can be discussed more fully than at larger meetings.

The work of the instructors has been quite satisfactory to the Board and myself. Some mistakes were made, but who is perfect? We are all gaining more knowledge each year in the work, and I know that every man on the staff did his best to improve the quality of the cheese and butter in the various sections. At all times they have been willing and anxious to carry out my wishes and those of the Association.

One of the pleasant features about our work is that there is the best of feeling between the staff of instructors and the Association. We all seem to realize that if there is going to be the strongest work done there must be the very closest co-operation, and I take this opportunity to thank the instructors and Directors, and especially those Directors who are on the Executive Committee, for their valuable assistance and kindness in carrying on the work of instruction.

I also appreciate very highly the assistance I received from the buyers. We cannot always see alike in all cases, yet they have given good advice, and also useful information, and I trust they will always do so. We realize that the cheese must be made to suit the buyer, and any information they have to give us we will be glad to receive.

I cannot close this report without expressing appreciation of the kindness shown me by the makers and factory men throughout Western Ontario. I shall never be able to repay many of them for their hospitality, but I appreciate very highly their kindness.

Mr. J. H. Monrad: I was very much interested in listening to Mr. Barr's report. One point I would like to refer to is the Babcock test. Do I understand that they are making these tests in order to find out the watered and skimmed milk? If so, I will take the opportunity of criticizing the system a little. I claim that no cheese company has the right to use public money for testing the milk, because every one of them ought to pay by the test. I do not see any reason why you go on in the old way, and do not pay by the test. I am astonished that you Canadians are not further ahead; we beat you in Wisconsin in that respect. It seems so absurd that when you have a simple test that you do not use it. It will simplify the matters between patron and cheese-maker, and will create a better feeling because there will be no suspicion on the part of the maker. If the farmer's wife wants to take a little cream for the coffee, if you pay by the test there is no trouble. You will find they won't take the cream for coffee or for ice cream at a church social if you pay by the test. It seems to me that it is a very important thing that you should adopt the system of paying by the test. I shall always criticize where I find that the instructors lose their time in making these tests to find whether there is water in the milk or not; in fact, acting as a sort of a detective. Their time would be far better spent making curd tests and visiting the patrons. One thing that astonished me in the report was the fact that some of the makers objected to the instructors visiting the patrons. I would like them to come up and explain why they did it. I would be tickled to death if I could get the instructors to talk to my patrons.

Mr. Freeman: The man he did not want him to visit is on the border of his factory route, and he is afraid the other man will get him.

Mr. Monrad: The report impresses me as an evidence of the good work that is being done, and I think you are to be congratulated on having succeeded in establishing this system. As I understand it, the factories pay part of the expenses and the Government pays the other part, and that is just what I like to see. I do not like to see the Government pay everything. You are just as much entitled to the Government money for education in this line as they are for universities and for educating lawyers and doctors. I have enjoyed very much being here, and I regret to say that I have got to go home.

The Chairman: I am sure it is with regret that we know Mr. Monrad is to leave us. On his arrival here he was not well, and he thinks the best place for him is now to get home. He is one of the old stand-bys of our convention. As long back as I can remember he has attended the convention. I admire him because he is a fighter. He will not let a statement that he thinks is would go by unchallenged. I think if the members of the Association would take up subjects as they come before them, and pick out the good parts from the bad, it will have a good effect. I was over in Milwaukee a few weeks past, and I do not think they have as intelligent a class of makers as we have, but over there you would see five or six men on the floor at once asking questions.

Mr. Freeman: As a farmer I want to get all out of this Government that I can. Of course I am willing to pay my share. I do not think a great deal of Mr. Monrad coming here and telling us the Government should not pay as much as they are. He says we should help ourselves. I say that is all right, but at the same time I say let us get all we can from the Government and do all the good we can with it.

Mr. Monrad: I said I objected to the Government paying all the expenses. I said that I thought the farmers were entitled to help in education, but if the Government did it all it would not be worth so much to you. I knew a man in New Zealand some twenty-five years ago, and he used to sell a much-advertised ointment. I said to him, "Is not a little bit of lard with carbolic acid just as good?" and he said, "My dear boy, you are right; but the people pay half a crown for a box of our ointment; they believe in it, they have faith in it, and it has a better effect. (Laughter.) In the same way, if you get everything from the Government you think you are being slighted; and if you would pay part of it,it would be better for you. I claim that the farmer should pay half these expenses, and the Government should pay the other half. I think you misunderstand me; because I am certainly in favor of the Government helping the farmers, because the farmers are scattered and do not get the benefit of our great educational institutions as the city people do.

Mr. George A. Putnam: The discussion which has taken place leads me to say a few words with regard to the facilities afforded by the Government for instructing the farmers. For a number of years we have been instructing them through the medium of Farmers' Institutes, and I take this opportunity of bringing the farmers to task for not taking advantage of the facilities which have been afforded them. It is true that we have a fair attendance of farmers at the Institute meetings, and at the special dairy meetings held by

Mr. Barr and the instructors from time to time, but the problem that we are up against is that we get practically the same men from year to year, and although the attendance last year was about one hundred and five thousand, still you must admit that that was a very small percentage of the farmers who should have taken advantage of this work.

Then we have the instructors going from factory to factory, and they have done a great deal of good. I do not think the Government has yet refused to put on an extra instructor when it has been asked. The regret that we have is that the poor factories do ot take advantage of the instruction work, but we hope to see some of them out of the business before very long. Our product will never reach that stage of perfection which we hope to attain until every person is prepared to do his little part. Last summer I attended a dairy meeting in the western part of the Province, and several prominent men in the district who had been active in establishing the factory were present. At the conclusion of the addresses one gentleman, who had been a director for twenty-seven years, came to me and said, "What does this mean?" I could hardly believe that a man who had been intimately connected with the factory so many years should come and ask what the instruction work meant.

I was pleased to hear it stated that the greatest good would result from meetings of that kind. I always advise my Institute speakers to make their subjects short, and then throw the meeting open for discussion, as I think the greatest good results from that method.

I desire to refer here to the danger that may result in reference to the bacon industry. I hear from time to time Institute speakers throughout the various parts of the Province, and I have heard from them during the last few days, and they state that they are quite surprised to find the feeling which exists over the Provinces with reference to this industry. Many of the farmers have lost faith in it, and are turning their attention to other lines of agricultural work. I regret this, because in the dairy sections they are not going to make the greatest profit unless they supplement their work by raising hogs. I just sound this note of warning to the dairymen that they should not allow the production of bacon hogs to go down.

Mr. Barr: With regard to this question of how much the farmer should pay and the factorymen pay and the Government pay for work of instruction, I may say that in Western Ontario there has been a little over $8,000 paid out for instruction work. The factorymen and patrons are paying about $2,200 towards this work, so you see the Government are spending about $6,000 and the factorymen and farmers about $2,000.

NOMINATING COMMITTEE.

Moved by William McCully, and seconded, that the following should compose the Nominating Committee: A. F. Clark, W. E. Booth, R. Myrick, S. P. Brown, and James Bristow.

Moved in amendment by F. J. Sleightholm, seconded by S. P. Brown, that the following compose the Nominating Committee: T. B. Miller, James Connolly, George Boyce, James McIlwraith, and A. Grant. The amendment carried.

CANADIAN CHEESE IN THE BRITISH MARKET.

By Prof. H. H. Dean, O.A.C., Guelph.

The programme committee has given me a subject which personally I should not have chosen. It is a very difficult thing for a person to visit the markets of Great Britain and come back to this country and give a report which will meet with the approval of every one who hears it, or which will coincide with a report from a person who has had similar opportunities. But before I take up my subject I would like to make one word of personal explanation. At the beginning of last year, at the close of the College term, I asked to be allowed two months' holidays. The Minister of Agriculture and the President of the College granted these holidays, and I left Canada on the 22nd of June and returned on the 20th of August. I went to Great Britain and the leading dairy countries of northern Europe as a private citizen. I had no special mission from the Government, and I speak to you to-day as a private individual who was granted two months' holidays, and who endeavored during those two months to keep his eyes and ears open to anything that might be of value to the dairyman of this country. Referring to the remark made by Prof. McKay last night, I would like to make one further word of explanation. He said he found Canadians a little inclined to not acknowledge they were from Canada. I made it my business to let everybody know I came from Canada, the best country in the world. (Laughter and applause.)

We have been recognizing certain standards for Canadian cheese as laid down by the Dairy Commissioner. I am not finding any fault with the standard. We have certain standards laid down by the cheese buyers of this country and by the cheese instructors. What struck me very forcibly in going about among these different men was that every man that you talked with in Great Britain seemed to have a different standard, and every man seemed to want a different kind of cheese; and the thought was suggested to me, might it not be worth considering that in some districts they might cater for the trade of a certain town in the Old Country? Of course I know cheese shipped from this country is classified in Ingersoll, Montreal, London, and Liverpool, and finally gets to the place where that cheese can be sold best; but it struck me that it might be worth while for certain districts in Canada to make the cheese which would especially cater for markets in Great Britain. I notice that a certain firm in Manchester has been criticizing me very severely because I said Manchester was one of the most difficult markets for Canadians to cater to. But after they said a good deal about the injustice of my conclusions they admitted that Manchester is a very difficult place to sell secondary butter in, and that is just the conclusion I came to. Nearly all the men I talked to wanted to place Canadian butter down third, fourth or fifth place, and they virtually admitted the argument I made that Manchester is a most difficult market for Canadians to sell butter in.

The first point I visited was Liverpool. Here the best ships that cross the Atlantic find their way, and they have excellent docks and cold storage, and so on. In Liverpool they want a rough texteured cheese of soft body. They showed me some cheese that had taken first prize in some competition they had there. It was what most of our makers would call a rough texture cheese; not that smooth, silky cheese that we talk about. While I was in one of the large warehouses in Liverpool a man came in to buy cheese, and he was shown a lot of Canadian cheese. One lot was badly off in flavor, and he wanted to buy this at five shillings per hundred weight less than he was willing to pay for first-class cheese. Somebody was losing five shillings per hundred weight on them, and all that was wrong with them was that they were a little bit off in flavor. The competition in Manchester is with the Cheshire cheese. The buyers go out to the farmers in the district of Cheshire and buy them, and a great many of them were bought on the market in Cheshire. They are a weak bodied open cheese. I talked with a man the first week in July, and he said he could buy this cheese at nine cents a pound and Canadian cheese was selling at nine and one-half cents in Canada, and he said they simply would not touch Canadian cheese at that money. It struck me that we had to meet that competition, and that it might perhaps pay us to make a cheese of that kind if we could get it over there before it spoilt. I do not know whether we can or not. Manchester struck me as being a difficult market to cater for. They said that unless they could buy Canadian butter and cheese cheap that they would not handle it. A man in the Old Country is handling Canadian produce for the money he can make out of it, and not on account of any sentiment. At the opening of the season these men had an idea that they were going to get Canadian cheese and butter cheap, and unless they can get it cheap they do not want to handle it. Right here let me say that the farmers of Canada owe a debt of gratitude to the cheese buyers and merchants of Canada, because these men put from five millions to six millions of dollars into the pockets of the farmers of this country last season because they held out for a high price for Canadian cheese. The men that I talked with at the beginning of the season were confident that they were going to get Canadian cheese cheap. They showed me advices they had received from correspondents in this country, and these advices read as follows: "Buy only for immediate use. Canada will have a large make of cheese. You will be able to get cheese later on in the season." Acting on these advices the Old Country merchants at the beginning of the season were very shy about buying cheese. But the cheese merchants of this country had the foresight to see that prices were bound to advance, and because they held out for higher prices they were able to put into the pockets of the farmers of this country nearly six million dollars. The men buying cheese in the Old Country are the shrewdest men in the business. In Manchester they have a large Produce Exchange, and it occurred to me that it would be a splendid thing if Canadians could have a small place in that immense building, where twice a week men could go and sell goods from samples, and where they meet men who are buying goods. I think it would pay us to have an advertising agent there; a good, sharp, shrewd man who could stand at that Produce Exchange and bring the value of Canadian goods to the attention of the British buyers.

Glasgow wants a close cheese. I gathered from what I saw there that that i the one market in the world where they specially require a close cheese. This great demand for closeness in the cheese in my judgment has put a yoke upon the cheese-makers which they are hardly able to bear. In order to get these very close cheese, which we are told is necessary for the markets of the world, we have to develop too much acid on our curds. It means more milk to make a pound of cheese, and it also means greater danger of getting what they call a bony cheese. That was about the only fault I heard regarding the Ontario cheese. They said there was a tendency for our Ontario cheese to be bony, that is a dry cheese: and of all the kinds of cheese which they do not want in the Old Country it is a hard dry cheese. They will take cheese off in flavor: almost any kind of cheese can be sold except a hard, dry, bony cheese.

In Leeds I had a very peculiar experience. I went into one of the large places there, and after discussing the matter with the head of the firm, I said.

"Have you any suggestion to make regarding Canadian cheese?" "Yes," he replied, "you are making your cheese too large now." He said the average man in that country did not want to lift such a heavy cheese. Very often a woman was in charge of the shop, and when she goes to handle a cheese weighing 75 or 80 or 90 pounds it is too heavy. He said, "I would recommend you Canadians to make a smaller cheese, say 60 or 65 pounds." I made a note of that. I thought it was a fine point. The very next place I went into in the same city I asked a similar question, "Do you think Canadian cheese are too large?" "Oh, no," he said. "Why," said I, "I was down the street, and a dealer said we were making a great mistake in making them too large." But the second man said, "Oh, no, they are not too large." That will give you an idea of the different opinions.

In Leeds I found the majority of the men did not favor paraffining the cheese. Most men in other markets said they liked paraffining all right if they were going to store the cheese.

One firm in Leeds claimed to have a monopoly of a certain well-known brand of Canadian cheese made in Western Ontario, and they said they got two shilings per hundred weight more for the cheese from this factory than they got from any other cheese that come into the warehouses. I said, "How many cheese do you get from that factory?" and I think they said a thousand boxes a week. And if I understand the situation rightly, I think the cheese from this factory do not go to Leeds at all. (Laughter.) They want an open cheese in Leeds, and a pale straw color. One man in that city said he preferred Canadian cheese to United States cheese, "because," said he, "we recognize that you are part of the British Empire," and that was the first time I heard any man mention that.

The complaint I met with in London was that up to about the time I arrived there, the middle of July, Canadian cheese were arriving there in worse condition than they did in 1904. A lot of cheese came in in a badly heated condition, and I found the same thing at Bristol. One boat came in, and the cheese were badly heated. One firm in London said they thought it was the duty of the Government to see that the cheese were carried from Canada to Great Britain in cold storage, so that the goods would not be heated. He drew a comparison between Canadian and New Zealand cheese, and our methods of handling dairy produce. One firm said they had no fault to find with Canadian cheese, no suggestion to make, everything seemed to be going on lovely with them.

The next place I visited was Bristol, and here I found that the Brockville cheese was the cheese that suited that market best. They also said that very often they got Quebec cheese which they liked better than Ontario cheese, and I asked them why, and they said because they were softer in body. I want to say that I am satisfied that we must make a cheese softer in body, a cheese with a more pliable texture, or Quebec is going to take the first place in the markets of Great Britain. I also found that some men were complaining about the boxes shipped from Eastern Ontario. They said that Eastern Ontario cheese and Quebec cheese arrived in poor boxes. One man in Glasgow said there was a lot of cheese from Western Ontario arrived in good boxes and with the weight stamped on the outside, and they certainly were attractive, and he said it was a class of cheese he was always pleased to handle.

We have at the present time a good reputation for our cheese in the markets of Great Britain, and a good reputation is equal to great riches: but we must look out that we do not lose our reputation. Every man engaged in the cheese business to-day, whether a buyer, a manufacturer, or a maker, should study what the market requirements are, and as far as possible make the cheese which will suit the market for which it is catering. If we do not make a cheese which suits them they will go to the other side of the world to get what they require. They have got the money, they have got the ships, and they will go where they will find the goods that suits them, and the goods out of which they can make the most money. (Applause.)

The CHAIRMAN: We have all been led to believe we had to make a uniform article of cheese, and you can see by this address that one market requires one kind of cheese and another market another kind. The trouble is that you generally have to buy your cheese before you sell them. I am glad he has given the buyers a little bit of credit.

Mr. J. A. RUDDICK: I have listened with very much interest to the remarks of Prof. Dean. I would like to say just at the beginning that I cannot emphasize too strongly what he has said with regard to keeping up your standard. If we continue to improve the quality there is room for an increase in the consumption of Canadian cheese. Prof. Dean touched on several important points, and his experience in Great Britain last year was similar to my own in many respects. I was particularly struck with what he said with regard to the different opinions expressed by different men. I was talking to a grocer, and he pointed to a piece of Cheshire cheese and he said he was selling it for twenty-two cents a pound. "That is the kind of cheese we want here," he said; "why don't you make cheese like that?" If we made cheese like that it would not be a Cheshire cheese, and the man who wants to buy Cheshire cheese goes to Cheshire for it. Canadian cheese is a type of cheese peculiar to this country, and that is the type they are looking for when they buy our cheese. Since I returned from the Old Country I have had Mr. Clement of Glasgow send out three Scotch Cheshires and one Dunlop cheese. I thought they would be of interest to the makers here. The style of finish on them is not remarkable, they are hardly up to the average of Scotch Cheddars. One is a year and one-half old, and the other was made last August. One man who sampled the Dunlop cheese in Eastern Ontario said, "Do they like that kind of cheese over there?" I said "Yes." And he said, "If we made a cheese like that here they would call it a second grade." And that is so, because we are not making a Dunlop cheese. I think if we stick to the line we have been following, and make as good a cheese as we can, we need not give ourselves very much concern as to what particular market the cheese is going to. I think there are variations enough to supply every demand. We have made our reputation for cheese on the strength of the standard we have set up, and Canadian cheese is a very great factor in the British market to-day. We are supplying eighty per cent. of the Cheddar cheese that is imported into Great Britain. There is a small quantity coming from New Zealand, but it has not increased in the last ten or twelve years, and I do not think they are likely to be a cheese-producing country. There are only some eighty-four cheese factories in the whole of New Zealand.

There is a very good lesson for us in the experience of the past year. I have on file a report of every steamer that arrives with cheese in the Old Country, also a report as to when it leaves Montreal, and taken as a whole there was very much less heated cheese delivered than ever before. At London all the cheese delivered by the Allan Line and the Thompson Line was delivered direct into the warehouses with a temperature of forty degrees: and Mr. Ralston and several merchants there gave it as their opinion at the end of September, that the improvement in the factories there had done more to encourage the consumption of cheese in London than any other one thing. They were not prepared to say the Canadian cheese was any better than they had been in the past, but they believe the fact that they were better taken care of was a strong factor in keeping up the price. The cheese is discharged at Tilbury, and then taken down to Commerce Road Station and delivered from there. In examining the cheese in the warehouses in the Old Country they seem to pay particular attention to the surface to see whether the cheese had been heated or not.

The total importation of cheese into Great Britain has not shown a great increase in the last ten years. Most of you know, I suppose, that Great Britain produces a great deal more cheese than we do in Canada. They are the biggest cheese producing country in the world. It is estimated that the annual output of cheese in the United Kingdom is something between 140,000 and 160,000 tons, and we have to compete with their cheese in their own market. I was very much impressed in visiting some of the large cheese dairies in Scotland where they make the Cheddar variety, largely in the district where Mr. Drummond is working, and I spent one whole day in company with Mr. John Robertson, travelling through the country around Castle Douglas. I was able to visit twelve or thirteen farms where they make the best cheese, and where I saw some of the finest stock I have ever had the privilege of looking at. This was during the first week in August, although most of the May, June and July cheese was still on the shelves. I did not find a single cheese off flavor, and the reason for that is that the temperature rarely comes above 65°, but that is not the whole explanation. The cheese I am speaking of are all made on the farms from the cows on that particular farm. The cows are usually in charge of the cheese-maker. The owner of the cows is a tenant farmer who rents one hundred, two hundred or three hundred acres. He owns all the stock, and rents the cows to the dairyman, who is a cheese-maker, and he pays cheese rent for the cows. He agrees to deliver to the owner so many pounds of cheese for every cow, and the surplus is his profit. He does all the milking, feeds the cows, and attends them throughout the whole year. It was interesting to see how this milk was handled. I inspected many of the stables. The cows were all milked in the stable, and after the cows had been turned out in the forenoon these stables were just as clean as they could possibly be, and on several farms where water was scarce they usually hauled it some distance to scrub out these stables. There was not a disagreeable odor of any kind. I was in the same stables when the cows were being milked, and the milker was as careful as he could be. There was no aeration practised there. The milk was cooled, although I never saw as perfectly flavored cheese as I did there. The whole secret is cleanliness and thoroughness, and not because they have any superior way of making cheese. I do not think the English or Scotch cheese maker is as well trained as the average Canadian cheese maker.

A MEMBER: Do they feed turnips?

A. No; they do not feed turnips to the milking cows. If they did they would have trouble. The standards for cheese and butter were not laid down by the Commissioner. They were arrived at by the conference of the buyers in Montreal and others who met there at my request, and adopted the standards after a full discussion. My idea was that the practice had been that cheese should be sold as finest, and if they were not up to the standard of finest they were to be classed as under finest and that did not mean anything at all. The cheese might be just a little under the standard of finest, and then they would be called under finest. Now it seemed to me that there was no reason why we should not have at least three grades of classifications of cheese and butter. Every other country in the world has at least that many, and there are a good many more in some places. You are in a very much better position if you receive a report that your cheese is second grade than you would be if you had a report that they were not finest. I had the assistance of Mr. Publow, and I had a conference with the exporters in Montreal to arrive at some definite standard, and I have no doubt it will give satisfaction.

INSTRUCTION IN CREAMERIES IN WESTERN ONTARIO, 1905.

By Geo. H. Barr, Chief Instructor.

The creamery industry in Western Ontario is increasing very rapidly. This year we have 71 creameries in operation against 59 in the same territory last year.

Of the 71, 53 were visited regularly by the instructors. Three instructors were employed this year, and the following table will give a detailed statement of their work:

Name of group and instructor.	Number of creameries.	Number employing instructor.	Number of visits.	Number of separator creameries.	Number of cream gathering.	Number using Babcock tester.	Number using oil test.	Number of combined churns.	Number of box churns.	Number of patrons visited.	Expenditure including new creameries.
Western:											$
F. Dean	27	21	144	4 and 8 combined	15	24	3	17	10	553	11,260
Kincardine:											
E. N. Hart	16	13	75	....None...	16	6	10	12	4	403	2,150
Eastern:											
C.W. McDougall	28	19	105	1 and 3 combined	24	19	9	24	4	58	4,800
Total	71	53	324	5 separator 11 combined	55	49	22	53	18	1,014	18,210

Note that there are five separators this year against thirteen last year, and eleven separator and cream-gathering combined against three last year. Forty-nine are using the Babcock tester against thirty-four last year. You will also see that the greater number are using combined churns.

There have not been as many farms visited as in 1904. This falling off is largely in the eastern group. Generally speaking, the quality of the butter has improved considerably. This is due largely to better methods in the creameries, and some improvement in the quality of the cream.

The butter has been shipped from the creameries earlier than formerly, which places it on the market in fresher condition. In the work of instruction, considerable attention was given to churning the cream at a temperature that would give a granule of an irregular shape instead of the hard round granule so common in churning thin cream. This method, along with the proper washing of the butter, has done much to improve the grain or texture of the butter as well as increase the amount of butter.

Considerable mottled butter was made during the early part of the season, and I am of the opinion the cause was lack of working. Some makers blamed preservatives, and others the salt, while one claimed he had mottled butter by over working. I trust these points will be thoroughly discussed to-day.

There is no doubt that the quality of our Western Ontario butter has improved greatly. Some of the creameries turn out butter equal to Danish, but the number doing this is by far too small. Why can they not all do it?

One thing that is very plain from the past year's work is that the finest butter was made in the creameries where a pasteurizer was used properly; and next, that the butter at the creameries, having proper cold storage, was sought after by the buyers. I am firmly of the opinion that four things are necessary to make our western creamery butter of the finest quality. 1st, we must make every effort to get the patrons to send sweet cream; 2nd, the cream must be properly pasteurized and cooled; 3rd, a pure culture must be used in the cream; 4th, the butter must be kept at 40 degrees or under.

The first is a huge problem, and can only be accomplished by persistent work on the part of the creamerymen and instructors.

The second means considerable expense to the creamery men, but I believe the improvement in the quality will pay for the outlay. The third is the only practical solution I can see to insure a uniform quality, and the fourth will preserve the quality.

There has been considerable improvement in keeping the creameries tidy and clean. I would like to see our butter-makers look more tidy and natty when in the creameries.

The instructors have done a lot of hard work, many times getting out on a cream wagon at 5 o'clock in the morning and riding forty or fifty miles before night. The creameries are paying a very small fee—$5, for the amount of work done by the instructors.

We could not possibly visit all the creameries and do the work properly with three men, but there will no doubt always be a considerable number that will not employ the instructors.

I am very well satisfied with the progress that has been made, but realize fully that there is great room for improvement in both the methods of making and equipment of the creameries. I trust the creamery men and butter-makers will make every effort to put their industry in Western Ontario at the top.

The Chairman: We want free discussion this afternoon on all these subjects. When we asked the creamery men to patronize the instructors, the response was very small. Only a creamery here and there would have an instructor, but now a great many of them are taking advantage of the opportunity we are giving them. In order to make fine butter you must have sweet cream and there is no reason why the patrons should not furnish the cream in a better condition than they have been. I have been in connection with the cream business myself, and I know that with very little effort on the part of the patrons they could improve the quality of the cream.

BUTTER MAKING: THE QUALITY AND QUANTITY.

By Prof. G. L. McKay, Ames, Iowa.

Before reading my paper I want to discuss for a few minutes, the subject that was mentioned last evening. Using a slang phrase, I am appearing in the line of "butting in." Your representative in the Legislature has made some remarks which he had a just right to do in regard to the departments of the Agricultural College at Guelph. I have had no connection with the college; I have not even the honor of being a graduate of that institution. The question brought up was that the dairy department of that institution did not pay. I have had to face the same problem, and I have taken the trouble to send to the different institutions in the United States and investigate the matter, and I have reports from one institution where their dairy department is costing them ten thousand dollars a year. I was sorry to see Prof. Dean trying to defend the method of making a Dairy School pay. Whenever you make a dairy school pay it will cease to be a dairy school. Our school has a board of trustees, and it is the duty of the members of the trust to investigate the different departments, and I have been hauled on the rack several times in regard to this particular question of making the dairy department pay. In the first place we have a lot of expensive machinery, and we have to run that machinery during the entire day, and we work at small quantities of butter, and consequently we have the expense of a large plant to work a small quantity. In my department we teach the making of ice cream. Do you suppose for one minute that we can prevent the student from sampling that cream? And there is a loss right there that the instructor cannot avoid. Then the milk is divided into small quantities, and they will make a hot iron test and the cream is wasted in several ways. You may tell a student that if he does a certain thing the result will be disastrous; but ten chances to one the bright American boy will go and do that very thing to find out for himself whether it is so or not. A dairy school will never pay for itself, because we are continually carrying on experiments. We are now carrying on an experiment that we are going to carry on for five ears, and the products we use will be practically wasted, and there will be a loss; but the result of this experiment may mean hundred of thousands of dollars to the public. Take up the department of Agronomy at Guelph. I am very well acquainted with Prof. Zavitz. He imports seeds from almost every part of the world and he tests them, and sometimes they will show up well for one or two years; but he carries them on for five years, and the farmers get the benefit of his experiments. I know very little little of the live stock except by reputation. We claim to have one of the best schools on the continent, in Iowa, and live stock seems to be our specialty. We have won the trophy from time to time at Chicago, but the past year these Canadian fellows came over and beat us out of our boots. I advise the farmers to stand by the Agricultural College. (Applause.)

I visited the experimental station at Indian Head last autumn, and I was told there that the farming country around Indian Head had been abandoned by the first settlers. The Bell farm was a failure, but the Experimental Station has demonstrated to the people that the farming land there is valuable, and now it is worth from $35 to $45 an acre, and the farmers are all prosperous, because they followed the methods laid down by the Experimental Station. Our State Government gave our dairy department $85,000 last year, ($75,000 for a dairy building), and we are asking $6,000 a year for the next two years for experimental work. That is what our people are doing in Iowa.

Mr. Sutherland: Would you permit me to ask Prof. McKay a question? I presume it is myself he is referring to. I made no reference last night to the dairy school at Guelph.

Prof. McKay: I do not want anyone here to get the wrong impression. The dairy school at Guelph is no different from any other dairy school.

Mr. Sutherland: It was the experimental dairy I referred to and not the dairy school at all.

Prof. McKay: You cannot carry on experiments without money.

Prof. McKay then proceeded: In discussing the quality and quantity of butter, I realize that I have two important items to deal with. Very few have any conception of the magnitude of the dairy industry of the United States. The value of the dairy products is about $700,000,000. The total value of the output of butter alone is nearly $300,000,000, which is a little more than 5 per cent. of all our agricultural products. Butter considered as a crop, is only exceeded in value by corn, wheat, hay, forage, and cotton. More than half this amount is produced in seven states, while general agriculture is carried on in practically all states. The annual value of the dairy and egg production of my state is greater than all the gold and silver produced in United States and Alaska. The consumption of butter is constantly on the increase. 94 per cent. of our butter is consumed at home, leaving only 6 per cent. for export. With our constantly increasing population, it is only a matter of time, if the quality is kept up to the standard of extra, until we will be compelled to import to supply local demand unless we greatly increase our output.

The greatest danger menacing the dairy industry to-day does not come from oleomargarine, but from the ranks of the creamerymen themselves, those who have placed quantity above quality. Deceit and fraud have never yet succeeded in building up an honest industry. Many of my audience, no doubt, remember the time when cheese at Little Falls and Utica markets, sold for a premium of ½ cent to ¾ cent per lb. above the Canadian cheese. To-day the Canadian cheese have a reputation in the English market that cannot be wrested from them as long as justice and right can control their output. This great change was brought about by some selfish scheming individuals in the United States who placed on the market skimmed milk cheese and filled cheese, and branded them as full cream cheese. This resulted in English merchants regarding all cheese from the United States with suspicion. This was a case where the innocent had to suffer through no fault of their own.

We find in the West, and Central West, that the whole system of butter-making has been practically changed in the last four or five years. A few individuals have been seized with the desire to control the great dairy industry of the country. The result is that the quality of butter has deteriorated so much that it is seriously affecting the consumption of butter. There never has been a time when good finished products could be made out of poor, decomposed, raw materials, and the same is just as true in butter-making as in any line of business. The sooner milk or cream is manufactured into butter or cheese, the better will be the quality of the finished product every time. That old saying, "Cleanliness is next to godliness," is true, and as applicable to dairying as anything that I know of.

What gives butter its selling value? It is not the body, or always the appearance, but it is flavor. This quality causes butter to sell higher than lard, tallow or any of the other fats.

Where cleanliness and care are observed, the Creator seems to have placed in milk all the necessary ingredients that go to make up good flavor in butter. Where cream is kept in an unsanitary place from three to six days, as is sometimes done by farmers who ship to central plants, the flavor of the butter is seriously injured and cannot be fully reclaimed by any method. A great deal has been written about pasteurization of such cream. When scoring butter and observing it in different places, I have come to the conclusion that pasteurization is of very little benefit, if any, to old, stale, over ripe cream. It is true that high heating will drive off some undesirable, volatile gases, but at the same time there is danger of producing other undersirable flavors in such old cream. I have a tub of butter in my laboratory that was sent by one of our large central plants to be inspected. The sender stated that they had lost thousands of dollars during the past summer, owing to the peculiar flavor the butter possessed. This flavor is called a metallic flavor. The writer stated that they had never been troubled with this kind of flavor until they began pasteurizing old cream. I have information from another reliable party, who operated a central plant, confirming the above statement from his own experience. Some people have an erroneous idea that pasteurization is a panacea for all defects in cream. Pasteurization does not destroy the flavor that is already present in decomposed cream, but it does largely destroy the germs that produce this flavor. When this flavor is already in the cream it cannot be removed by pasteurization. Every loss that is sustained in manufacturing this kind of cream is a great injury to the dairy business.

Denmark has made a great success with pasteurization, because they have followed the method of only pasteurizing good cream. Their system is practically the whole milk system. They skim cream that contains a uniform amount of fat from day to day, pasteurize the same when it is sweet, cool to a certain temperature, and use a certain amount of starter. The result is a uniform product, which is much desired by the English merchant. It is not so much the superiority in quality of the Danish butter as it is its uniformity that gives it the standing it has in the English market. They were beaten at the Paris Exposition by American butter, made from raw cream in the competition for the grand prize. I believe the reason why pasteurization has taken such a firm hold in Denmark, is because the cows are kept in the barn almost the entire year. The result is that the majority of bacteria that get into their milk comes from the stable and belong to the putrefactive group. By pasteurizing to extreme high temperatures, the same as they use, these germs are destroyed before they produce serious defects. Then by using a good commercial starter, they are able to control the ripening of their cream, and produce a uniform article of butter.

We have one large, full milk creamery in our State where the maker, who is an exceedingly bright fellow, offered prizes to the milk haulers who brought in the best grade of milk. The result was a rivalry of patrons on the different routes, which proved so beneficial to the creamery that this maker won first place, twice, at the St. Louis Exposition World's Fair, on his butter. He was finally induced to go to another creamery with a raise of $25 per month. The maker who followed him was also able to keep up the same high quality of butter, owing to the excellent milk furnished by these educated patrons. I refer to the Farmers' Co-operative Creamery at Arlington, Iowa. So we find the flavor of butter depends to a very large extent on the kind of milk or cream furnished by the patrons. Of course it is possible for a poor maker to spoil the best kind of milk and cream.

Judging from the amount of letters I receive on the subject of churn overrun, the question of quantity seems to be the important question with creamerymen to-day. I have been severely censured, particularly in the east, for issuing a bulletin on the methods of controlling moisture in butter. I am a firm believer that every butter-maker should be thoroughly posted on all the secrets pertaining to the butter business. A gun is a very useful article when rightly used, but in the hands of an ignorant or dishonest person it becomes a menace to public to public welfare; so is the water content of butter. We have a number of large creameries that have carried the moisture business to such an extreme that they have seriously injured the quality of their butter. The maker who gets 30 to 35 per cent. overrun is perpetrating a fraud on the public, by selling a surplus of moisture for butter, or more water than the law permits. Now, on the other hand, I do not advocate an extreme dry butter, as I believe butter that contains 14 or 15 per cent. of water will usually possess more flavor and show a better color than butter that contains 7 or 8 per cent. Butter is intended to spread on bread, so it must necessarily be plastic.

The Danish butter has been held up to the rest of the world as model butter. We find, for a number of years back, that they have been constantly increasing the moisture content of their butter, so much so that the English merchants have complained lately about it. When I visited the English markets in 1901, I heard no complaint against the Danish butter in this particular. In 1895, we find that the average water content of Danish butter was 13.70: in 1896, we notice a slight decrease, 13.68; in 1897, the average was 13.79, a slight increase; in 1898, it was 13.93; in 1899 it was 14.06: in 1900 it was 14.09: in 1902 it was 14.52. So we find that up to this date there has not been any complaint against Danish butter for excessive moisture content. All countries seem to have fixed about the same standard for water content, namely: 16 per cent. as a maximum. Now my advice to makers would be, to endeavor to incorporate 14 or 14½ per cent. water. A 14 per cent. water content would give you an overrun of about 21 per cent., and allow you a little for waste. You can add about one-fifth the water content of salt, or in other words, the water in butter will take up one-fifth of its bulk in a saturated solution, or butter containing 15 per cent. water will stand 3 per cent. salt in the finished product. Three per cent salt suits the average American market well. This much salt can be incorporated without the butter being gritty or seeming over salted to the taste. A medium high salted butter is less frequently attacked by mould, as salt is an antiseptic. It would seem from investigations that are being pursued by the dairy department at Washington, D.C., and at Ames Iowa State College, that the high salting of butter is not desirable for storage purposes. Notwithstanding the fact that millions and millions of dollars are invested annually in storage butter, there is practically no information available on the making of butter for storage purposes, and the best temperatures for keeping it in cold storage. I believe from the work that we are pursuing, in connection with the Department of Agriculture of Washington, D.C., that we will be in a position to give out definite information on this subject before the next storage season. We found, from experiments carried on at Ames a few years ago, that butter salted lightly had a tendency after standing a while in cold storage to show a cheesy flavor, while butter salted heavily showed a fishy flavor. These experiments were carried on where ice was used for refrigerating purposes, hence the temperatures were not as low as when artificial refrigeration was used. A few weeks ago I had the privilege of scoring some 200 samples of experimental butter. The different tests had been packed from the same churning, so any defects occuring were due to after considerations. In every case where butter had been kept at 10° below zero, the light salted butter showed up about as fresh and sweet as the day it was made, while the high salted butter had a slight fishy flavor. When butter was kept at 10° below zero, it scored from three to four points higher than that kept at 32° above. In fact, in some cases we found a difference of six points.

The question of air spaces being left in packages is receiving special attention in our experiments, and indications are that it has a serious bearing on the keeping quality of butter.

The factors that control the water content of butter are: temperature of churning, thickness of cream, amount of cream churned at a time, condition of churning and working of butter in water. A thick cream will give a higher per cent. of overrun than a thin cream, under normal condition, or in other words, a cream containing 40 per cent. or 45 per cent. fat will give you a larger overrun than a 20 or 25 per cent. cream, unless you use some other method of changing the natural conditions of the latter churning. The reason why a thick cream will give you a greater overrun is undoubtedly due to the formation of the butter granules. In a thick cream the granules gather irregular in size and somewhat oblong in shape, and the fat is not driven together so firmly as in a thin cream. It has been thoroughly demonstrated in the large creameries, where a detailed record is kept of all work, that a churn filled two-thirds full with cream will give a much higher per cent. of overrun than one filled one-third under normal conditions. A large churning is not influenced by atmospheric conditions as much as a smaller churning, and the butter gathers in a more flocculent condition: that is, the fat is not driven together so firmly as in a small churning. When over 16 per cent. of water is incorporated in butter, it is usually accomplished at the expense of the body, as when butter takes up an excessive amount of water it must become somewhat soft or pasty in character. It has been known for years that some farm or dairy butter contained in some cases 25 or 30 per cent. of water. Some of the butter contained so much water that it affected its color, giving it a light, pale, lifeless color. Excessive churning or churning it in large rolls will give you a high per cent. of water. It is unnecessary for me to spend any time here in discussing the different fat contents of butter. Taking butter as a whole there is more moisture incorporated in summer months than in winter months, as butter has a lower melting point at this period. In the winter months when butter contains more stearine, it will stand much more working to bring about the same condition as in the summer. To demonstrate this more fully I will give you a crude illustration. The majority of you are familiar with putty. You take a piece of putty that is somewhat dry, and you invariably use oil to soften it. When you just crush it in the oil, very little change takes place. After a time, however, the putty assumes a pasty condition, and takes up the oil very quickly. If however, you continue to work it in the oil, the putty becomes short and brittle in the grain. Butter acts very much the same with water as the putty does with oil. The method usually used by those creameries that have incorporated an abnormal amount of water is as follows: They churn at a low enough temperature to get an exhaustive churning and churn butter in large granules. They wash the butter very little, and then place enough water on it to make it float or about 50 or 60 gallons to a churning. The rolls are then placed in slow gear, and the butter is worked the same as when working in the salt. The number of revolutions they give the churn will depend on the amount of water they wish to incorporate in the butter. In the winter months they usually give it about twenty revolutions and in the summer, eight to ten. This, of course, depends entirely on condition of butter or temperature of cream when churned. Prof. Gray of Washington, D.C., who is now associated with our school, and who used to be chemist for the big Continental Creamery Co., has told me that so completely did one of their makers have this system under his control, that he did not vary the moisture content of his butter over 1 per cent. during one month where Mr. Gray made chemical analysis daily. When you first begin to work butter in water, the moisture content is expelled from the butter, but after it softens up it takes up water very rapidly: so that the greater number of revolutions you give the churn at this period the higher your water content will be. Of course excessive churning will give you the same result, but the water content cannot be kept as uniform as in the other method. To get uniform results in churning, cream should be cooled at least two hours before churning. It would be better to cool it four hours. After the butter has been worked the desired number of revolutions, the water is removed, and the butter is salted at the rate of about 7½ lbs. of salt to every 100 lbs. of butter fat. This leaves about 3½ per cent. of salt in the finished product. It takes about twenty revolutions with the Disbrow churn to incorporate salt, and fifteen with the Victor churn. Where extreme fancy butter is desired, it is better to avoid the excessive churning or working the butter in water. I would advise churning in middling large granules and have the butter gather in about 30 or 40 minutes, not hard or very soft, but pliable to the hand. Remove buttermilk as quickly as possible and wash with water at about the same temperature as the butter. Apply salt as soon as wash water is removed, while the butter is yet soft. It is the water in the butter that largely dissolves the salt; hence, if salt is quickly mixed with the butter when it is in a moist condition it will require less working to get the salt thoroughly dissolved. Many creamery-men make the mistake in the winter months of permitting their butter to drain too dry and become somewhat chilled before applying the salt. This invariably means extra working or mottled butter, and a low per cent. of moisture. If one creamery gets 5 per cent. more overrun than another creamery, or a gain of 5 lbs. on every 100 lbs. of butter, it is only reasonable that they can pay more for butter fat. Some of the best buttermakers that we have in our State, men who are getting 1½ or 2 cents per lb. premium on their butter, are the makers who are thoroughly posted on this moisture question, who always get a good overrun, and who do not go to either extreme.

This whole question of excessive water and salt should be of second consideration to the butter-maker. Quality should always be the first consideration. Therefore, if you cannot make the highest quality of butter, and incorporate 14 per cent. of water, go back to 12 per cent.

I believe it is possible to make just as good butter with 14 per cent. water as with 12 per cent. This, of course, is just my private opinion. In the making of butter, cheese or anything else, the maker must be guided by the requirements of the market and should endeavor to make the quality of his goods suit the demand.

Caution should always be exercised in making any radical changes.

The CHAIRMAN: This paper of Prof. McKay's is one of the best I have ever listened to.

Mr. F. DEAN: I am very sorry that Mr. Monrad has gone away this afternoon. I had no intention of taking up this part of the discussion. I may say that in Canada we have a fine lot of men engaged in the butter-making business, and I do not think there is any danger of their overdoing this moisture content. It is a question that has caused a great deal more discussion than any other subject brought before the butter-maker. The factories in Western Ontario that are looking into this overrun question have paid more money than those that did not take it into consideration. One factory that followed my suggestions, and these suggestions Prof. McKay has just laid down, has paid the patrons $950 more money than another creamery that did not follow out that instruction. That is just for one month, and if you take that same amount for five or six months it means some thousands of dollars. I heard that the man who had the larger percentage of moisture in the butter had the best butter. I think if we have a less percentage of moisture in the butter it is not as good a quality. A census was taken some years ago, and the average was only about 11 per cent. of moisture in the butter, and if we can increase that 2 or 3 per cent. it means a lot of money.

Mr. Steinhoff: Do you say that $950 of gain was on the same amount of butter fat?

Mr. Dean: Less butter fat. There was a difference in the price received. I put it to the amount of moisture in the butter. The patrons received $950 more for the fat they sent to the creamery than was received for the same amount of fat sent to another creamery.

The Chairman: You do not know what difference there was in the price?

Mr. Dean: Yes, there was a difference of about three cents per pound received, and there was a difference of seven cents paid the patron in fat.

A Member: What was the difference in the percentage of moisture?

Mr. Dean: The overrun of one was 20 per cent., and the other one 15 per cent., I think.

The Chairman: $950 was not paid for the same amount of butter, but the amount is made up in the price.

Mr. Dean: One factory had an average of about 3 per cent. of fat in the buttermilk. I took a sample on two different days, and it never was below 3 per cent. of fat in the buttermilk, and the other creamery only had about 2 per cent., and that would make a difference of $100.

The Chairman: Did the creamery still retain that maker?

Mr. Dean: They did not know it.

Mr. Steinhoff: Would that loss in the buttermilk be the result of not leaving sufficient moisture?

Mr. Dean: The man did not know his business. The majority of our butter-makers know their business, but we have a few who had better go into something else. You must understand your business. This moisture content in the hands of some of our butter makers would do a lot of harm.

Mr. Steinhoff: Have you made any tests to show what the percentage of moisture should be?

Mr. Dean: I think Prof. Harcourt has had some samples made, but I think he has had some trouble in getting the right percentage of moisture.

Prof. Harcourt: We have had a number of samples sent in, and in many cases these samples were simply rolled in paper, and the inside of the paper was covered with moisture which we could not again incorporate into the butter, so that our results practically meant nothing. This coming season I intend to study the whole question of the moisture content, and we hope to arrange to have bottles to take the butter in, so that we can melt up the butter in the bottle and secure the proper amount of moisure. If we can do anything to help to study out this question we are only too willing to do it. When Mr. Dean was speaking I thought he had added $950 worth of water to the butter, but now I uuderstand that is not the case, for they had a poor butter-maker in the one case and a good butter-maker in the other, and it illustrates what a good man can do.

Mr. Steinhoff: Do I understand you to say that you consider twenty per cent. is a fair amount of overrun?

Prof. McKay: Twenty per cent. on the butter fat you pay for.

Prof. Dean: Would you think the increased overrun of five per cent. might be due entirely to the extra moisture, or might there be some other factor?

Prof. Harcourt: The loss of butter fat in the churning is an important item in this case, and there is the addition of other products. The overrun must be influenced largely by the percentage of water. We all know that butter differs in the amount of moisture in different parts. If you take the same churning, different parts will have different quantities of water, so that one part might give a heavier overrun than another part. And we know that even in a print of butter there will be different amounts of moisture in different parts of that print, so you see there are a number of factors that have to be looked into carefully before you can answer definitely the moisture question.

A MEMBER: Is there any official method recognized by chemists for ascertaining the moisture in the butter?

Prof. HARCOURT: There is an official method that is recognized by the Agricultural Chemists' Association of this continent, and that is the one that we shall follow out in determining the moisture. I cannot say on what that method has been based. There is a possibility of the moisture content standing higher than the figures would give, but we intend to look into that point to see whether there is anything in it or not. So far as things stand to-day there is an official method, and determinations made by that would stand in any court on this continent.

Mr. McLEAN: Please state the proportion of butter fat, salt, and the casein in twenty per cent. of the overrun?

Prof. HARCOURT: This is a question that is hard to answer. In our general analysis of butter we will have very little over a half per cent. of curdy matter, and then there will be the salt. If you add up the 3 per cent. of salt you will have that, and then the fat will vary according to the amount of moisture. If the moisture runs 14 per cent. I would figure on the balance being made up of fat, that would make 17½ and the balance fat.

Mr. STEINHOFF: I think this question of moisture in the butter is comparatively new in our experience, and it is very important that we get as near to the truth of the matter as possible. I took a good deal of interest in the matter from the time Prof. McKay gave his address last year, and advocated a fair amount of moisture being left in the butter, and it is my judgment that quite a lot of our summer-made butter has been too stiff. It has been hard to spread, and where the makers have been judicious in leaving more moisture in the butter I have noticed that there has been a benefit. I have seen better butter in a number of the creameries this year on that account. In other cases they have gone to the extreme, and I think the mottled butter this year came from attempting to leave too much moisture in the butter, which is partly buttermilk. I think if the matter is watched closely, and the right amount of water left in the butter, more water can be sold with the butter, especially if it is for local use.

A MEMBER: I understood Prof. McKay to say that he would put seven pounds of salt to one hundred and twenty pounds of butter, which would be about 5.8 per cent. When he got his butter worked he would calculate it at three per cent.

Prof. McKAY: Seven and a half pounds of salt to one hundred pounds of butter fat. The question of overrun is not always thoroughly understood by the public. We get sixteen per cent. of water, three per cent. of salt, and one per cent. of curd or casein. That is twenty-five per cent. overrun. We base our overrun on the butter fat. If we have one hundred pounds of fat, and if the overrun is in the same proportion, we would have twenty-five per cent.

Now this question of overrun is very important, and I want to caution the makers against going to the extreme on this question. About two years ago I conducted a scoring contest, and I had makers send in butter from different parts of our State, and we made a chemical analysis of the different lots of butter. We scored them at the College, and then sent the butter to New York, and it was re-scored for the purpose of testing the keeping qualities. We have some creameries where they receive sixty or seventy thousand pounds of milk a day. One creamery sent to the School for a first-class butter-maker, and I sent a young Dane to their annual meeting. He was one of the best men we have in the country on this question of overrun. The directors of the factory were Norwegians. He asked them $100 a month. They had been paying $50 or $55, and they were amazed at the figures he asked. They said, "We cannot pay you any such price." Another young man said, "I will work for fifty-five dollars." Our young man said, "I will make more than the difference in the wages in the question of overrun." And one of the directors said, "The separators skim just as clean for that man as for you, and all you have to do is to sour the cream; that is all there is to it." Through the summer months I received butter from that plant, and I also received butter from Strawberry Point, where H. J. Evans, one of our fourth year graduates has charge. He is getting $1,500 a year at the present time, and his butter is selling for one-half cent more a pound than the Norwegian creamery butter, and, although they both did the same kind of skimming, Mr. Evans was making $17.50 worth more of butter a day than the Norwegian creameries. In the one case they saved $45 a month on wages, and lost $450 a month on quantity, being a penny wise and pound foolish method. (Applause.)

Mr. J. E. Bower: This is a question of importance to us. Prof. McKay discussed last evening the keeping qualities of butter. We have a local market for nearly all our butter, and in that case I think the incorporation of moisture would do no very great injury; but we have also got to face the question of shipping our butter to the Old Country markets, and it is a well known fact that one of the principal methods of keeping any product is to dry out the moisture. I would like to ask if we are not in danger of losing the keeping qualities of our butter and doing ourselves a greater injury than we will benefit by the increased price that we will get?

Prof. McKay: Three years ago I was in England looking up the butter question. I sampled butter from the different firms there and made a test at my hotel, and I found that the New Zealand butter was the lowest in moisture contents. It showed about eight or nine per cent. water, and I found the Danish butter that was selling at from two to three cents a pound higher contained about fourteen or fifteen per cent. of water. The keeping quality of the butter depends a great deal on the cream in the first place.

Prof. Ruddick: I have been very much interested in this discussion. I think it is very valuable. We should know before we put too much strees on this point just exactly what we are doing. I believe a great deal of the butter in Western Ontario has been improved by incorporating more moisture. Butter really is a mixture of butter fat and water. It is not fair to assume that the butter has been improved by adding moisture to it—simply by adding the correct amount of moisture and making it what it should be. We should be careful about drawing any hasty conclusions. I am very glad to know that Prof. Harcourt is going to study this question, and get reliable data as to the moisture contained in the butter. Prof. McKay mentioned the fact that he found New Zealand butter selling for less than Danish butter. and also the fact that it contained a good deal less water. New Zealand butter was selling for more than Canadian butter. We believe it is possible to have 14 per cent. of water in the butter. One of the largest exporters in Denmark told me that the quality was deteriorating, and he attributed it to the fact that they had been carrying this moisture too far, and yet they had not exceeded the limit of sixteen per cent. I believe there is a danger in trifling with it.

S. T. Brown: Mr. McKay spoke of incorporating moisture up to 14½ per cent., and he also said, "If we cannot conserve the quality of the butter at that percentage, we had better go back to the twelve per cent," and I think there is the key-note to the whole thing.

The CHAIRMAN: I am very glad that this discussion has taken the form it has, because we cannot afford to spoil our product in trying to get a little more moisture incorporated in our butter. We have an example of that in New York State in connection with their cheese. It is simply a matter of how many pounds of cheese they can make out of one hundred pounds of milk, and their cheese is not so good to-day as it was eighteen years ago. They are making nothing but mush. We have started to make a reputation for butter this year, and let us keep at it.

Mr. McLEAN: Is it possible to work a Simplex or Success churn in the way you have mentioned—that is in finishing the butter to give a second working?

Prof. McKAY: Working butter with the Simplex churn would be entirely the same. The reason we work it in that condition is to soften the butter. We work it out through the rolls so that we can control the percentage of water. I would advise using a small quantity of water.

Mr. McPHAIL: You still use water?

Prof. McKAY: Yes, the working of the rolls softens the butter and you can tell about the percentage you are incorporating. In our State they test the butter from time to time, so as to keep themselves posted as to the amount of water they have in the butter.

REPORT ON JUDGING BUTTER.

Prof. McKAY: It was my privilege to score the butter last year. I have had the privilege of scoring butter in various parts of the continent, so that I feel I can claim to be an authority on the subject. Your butter this year is much better than last year. (Applause.) There is a general improvement The highest type of butter scored 97½ points. That butter would have competed successfully, or, at least, would be very close to the top, if not at the top at one of our large national contests.

I have seen some butter here that was made by Mr. Waddell. It was kept in storage since October. That butter scored 96½ out of a possible 100. I do not know Mr. Waddell personally, but I must say that it was as fine a piece of butter as I have ever scored at any place, for butter that was kept in cold storage. (Applause.) If you can send that kind of butter to the English market there would be no question about Canadian butter leading there. The most common fault I found in the butter this time is what is known as stable flavor, sometimes described as "natural condition." Butter or milk takes up flavors by absorption. If milk is kept long in the stable it takes up odors from the barn that are transmitted to the butter, and the best thing to counteract that is to use a commercial starter. Years ago we used to attribute the defects in the butter to the food consumed by the cows, sable conditions, and other causes, when the trouble is really due to bacteria that gets into the milk from the stables. I had our bacteriologist examine milk in the summer and in the winter, and he found 90 per cent. of bacteria of a desirable kind in the milk in June, and none of these flavor producing bacteria were in the milk in the winter months. But he found about 80 per cent. of undesirable bacteria during the winter months. We have to overcome that. An intelligent butter-maker usually resorts to skimming a very thick cream and getting rid of as much of the milk serum as possible. Then he adds what is known as "pure culture," an enormous quantity of the right kind of bacteria, just like adding yeast to bread. If a heavy starter of that kind is used during the winter months, I believe you can improve your butter. I am satisfied the man who got the highest score uses a good commercial starter. Taking your butter as a whole, you can compare very favorably with any exhibit I have scored during the past year. (Applause.)

The Chairman: It should be very gratifying to the creamery men to know that their exhibit of butter is much better than last year, and I expect next year that it will be better than this year. I hope that we will have Prof. McKay over to again do our judging, and to give us a talk along the lines that he is carrying out on the other side.

A Member: Is Mr. Waddell's factory a separator factory or a cream-gathering factory?

Mr. Waddell: I may say that this butter was made from milk taken in and separated in the factory, and I may also state that there was no milk in that butter that was more than one day old. I think we get the best flavor from milk that is not kept too long, and from cream that is not kept too long. I think, probably, the great fault in our butter is that the cream is kept too long before it is churned. I may also say that I used a "culture" in making this butter, as I always do.

The Chairman: Can you tell us what temperature it was kept at?

Mr. Waddell: It left me immediately, and went to the London Cold Storage.

Mr. Barr: Ten above zero at London.

A Lady Member: Was the cream pasteurized?

Mr. Waddell: Yes, about .5 of acid by the acidimeter when the cream was churned. I think Mr. Barr has a full report of that, and, no doubt, it will come out in the report.

Prof. McKay: What percentage of starter did you use?

Mr. Waddell: I think about five per cent., if I remember rightly.

A Member: We have a cream-gathering creamery, and we take the cream from every patron on the route, never missing one. They did not know whether I was going to churn from the cream that day for the prize or not. We lost in flavor. We took ninety-three per cent.

The Chairman: You should tell them you are going to make prize butter next year.

Winter Creamery Butter, 56 Pound Boxes.

	Total Score.
1st. Fenton E. Brown, Strathroy	97.50
2nd. G. M. McKenzie, Ingersoll	95.75
3rd and 4th tie. S. P. Brown, Birnam; S. E. Facey, Harrietsville	94

Winter Creamery Butter, Ten One Pound Prints.

1st. Thos. Malcolm, Kinlough	95.50
2nd. Miss A. W. Green, Aylmer	95.25
3rd. G. M. McKenzie, Ingersoll	94.50

October Creamery Butter, 56 Pound Box.

1st. W. Waddell, Kerwood	96.50
2nd. Fenton E. Brown, Strathroy	94.50
3rd. Geo. Balkwill, LaFontaine	93.75
4th tie. Canadian Milk Products, G. Dobbie, maker, Brownsville; W. K. McLeod, Vanneck	93.50

KINCARDINE GROUP, SPECIAL.

1st. Wm. McKay, Underwood	93.50
2nd. W. McGregor, Londesboro	92.75

ALDERNEY BUTTER COLOR, SPECIAL.

1st. Fenton E. Brown, Strathroy	97.50
2nd. W. Waddell, Kerwood	96.50

RYRIE BROS., SPECIAL.

Best finished and most atractive exhibit of butter, sterling silver medal, H. Weston Parry, Princeton.

CANADIAN BUTTER IN BRITISH MARKETS.

BY J. A. RUDDICK, DAIRY COMMISSIONER, OTTAWA.

I am glad to learn of the progress which has been made in Western Ontario. I believe there is no district where more progress has been made. I think there is still room for improvement, and I hope the good work will go on. I believe it is in the right hands to insure that result. Canadian butter made great progress on the British market the past season, and I think that is due to one or two causes. In the first place there was a shortage of butter on the English market through continental sources, and, therefore, there was more prompt shipment, and Canadian butter was not held in store. A great many of the grocers had not heard of Canadian butter. Many of the men were very much pleased with the result, and they were able to make much more money by selling Canadian butter, and it gave very good satisfaction. It is very important that those who are handling our butter should be able to make some money out of it. The dealer over there does not care anything particularly about the quality, he would just as soon make a shilling a hundred out of second-class as first-class. It is a matter of pounds, shillings and pence. I was told by a merchant in Leith, who handles a lot of Canadian butter, that he could name six creameries that he handled for last summer, and he would just as soon have their butter as the average Danish. He believed the value was in it, but he could not get as much for it. Canadian creamery butter sold in London during September for one hundred and twenty shillings a hundred, and Danish was selling from one hundred and eighteen to one hundred and twenty-two. It was put up in keils, the same kind of packages as the Danish. That is certainly proof that the butter can be produced in this country and placed on the market there in condition to compete with the best butter imported into Great Britain. Prompt shipments have been very important factors in helping the Canadian butter during the past season.

There is another important matter, and that is better facilities for handling butter on the other side. In the past there has been a good deal of butter discharged from the steamers and deposited on the quays, and left there for several days in a warm shed with the temperature often as high as seventy degrees.

Some of you are familiar with the controversy and the correspondence that has taken place between the Dominion Department of Agriculture and the authorities at Liverpool regarding delays in moving the butter from the sheds. There have been some delays of that sort at Glasgow and Bristol. They have remedied it entirely at London. The butter is never left on the quays at all, but it passes directly from the cold storage department on the steamship to a cold storage warehouse, where it is kept at a temperature of 17 degrees.

The position of Canadian butter in the British market is very different from that of cheese. We practically have no competition in the cheese business, and I think we take too much credit to ourselves in having captured the British market. We never did anything of the kind. Our competitors left that market, and it was there for us to take because no one would take it. It has been an easy matter to capture the British market with our cheese, but we will have an entirely different row to hoe in capturing the butter trade, because the competition is an entirely different thing. The competition a few years ago was not as keen as it is to-day in any of these lines. We now have the competition of the Irish butter. That country sends about five times as much butter to England and Scotland as we do, and the butter is very much of the same character. About two-thirds of it is creamery butter. They have 800 creameries in Ireland, and they are turning out a nice article of butter. I had special opportunities of examining the Irish butter, not only at the warehouses in England and Scotland, but I happened to be in Dublin at the time of one of the prize competitions, and I was invited to examine it and visit the other great dairy centres like Limerick and Cork, and I tell you we have a very strong competitor in the Irish butter. Of course we recognize the Danish butter as being our great competitor. There are no statistics with regard to the Irish butter, because it does not go through ports of entry. Danish butter attracts more attention on that account, because we hear a great deal about it. There is no doubt the Danish butter stands at the top for uniform excellency of quality. A good deal of Danish butter has gone off in quality, and they give me as a reason for that that it contains too much moisture. Another reason that they gave me was that the competition had been so great that exporters had paid practically he same price for all the butter. They are not making the distinction in quality that they should make, consequently there is no inducement to keep up the quality. That is a difficulty which is met with everywhere in work of this kind.

There is a very large quantity of butter coming from Sweden. The Danes had a national brand, and until a year or so ago this brand was controlled by an Association. At the present time it is placed on every package of butter exported from the country, and they have done that to prevent butter from other countries being sold as Danish butter on the British markets. Their position is a peculiar one, having a reputation of sending the best. There is a temptation on the part of others to imitate or substitute their butter for the Danish, and they feel it is wise to protect themselves in that respect. In Sweden the brand is used only by those creameries whose product comes up to a certain quality. There is a committee sent out, and they take samples from time to time, and if the creameries after two or three examinations reach a certain quality, then they are allowed to use the national brand, and if the quality falls away then the brand is taken away from them.

A good deal of butter comes from Siberia. I saw some of it that came from there some time ago, and it was second or third grade butter. It has a heavy, waxy body. Siberian butter fills quite a large place on the British market. They also use Norwegian butter, and butter from Argentina is occupying the attention of the trade. It is sent at a different season from ours. It comes in at the same time as New Zealand and Australian butter.

I saw a quantity of butter from Iceland in a warehouse at Leeds, and they stated that they were receiving regular consignments of butter from Iceland. I understand a large portion of the milk is from sheep. The butter resembled second grade Siberian more than anything else I saw.

Two years ago Germany was quite a large exporter of butter to Great Britain, but during the past year they have been importing rather than exporting. I had an opportunity of visiting some of the big butter markets at Hamburg, and came in contact with the butter merchants there. I learned that in future Germany will import a large quantity of butter. The industrial conditions are so changed that a large class of people who in years gone by never tasted butter can now afford to eat it. There is a demand for cheap butter, and a good deal of butter from Canada has found its way to Germany. Some of the butter that was delayed on the quays was waiting for a steamer to be re-shipped to Hamburg. There is a duty of two cents a pound on butter, but there is no duty on cream, and the line between Denmark and Germany is an imaginary one, and they have established creameries just across the line, and they take the cream across to Germany and manufacture it into butter, and in that way they have closed several large creameries in Denmark, and are now sending the cream across to Germany. The duty on Canadian butter will be three cents a pound after the first of March.

I visited London, Liverpool, Manchester, Leeds, Glasgow and Bristol, and I find as a result that there is not very much difference of opinion regarding the improvement in Canadian butter this year. One man in Manchester told me he had been handling a very large quantity and was very well pleased with it. He said that small customers of his who sold about two casks a week often had difficulty in competing with large stores who bought cheaper than he did and sold at a price that he could hardly make any profit in selling at, and Mr. Graham persuaded him to try Canadian, and he said the result was such that the man who was selling two keils a week was selling about fourteen boxes, and he was a big advocate of our butter, and said it was the finest butter on the market. It is a great thing to have the man who handles the butter pleased with it.

I visited some of the big houses in company with Prof. Dean, and we were given every facility possible for getting information. We never found anyone who could not spare a few moments to talk with us and give us information concerning Canadian produce. I was sorry to find, during one of my last visits to London, about the middle of September, that they had received a number of packages of very badly moulded butter. I saw one lot of butter that was moulded in a peculiar way. It was a different color from anything I have ever seen, it was a sort of reddish brown color, and it seemed to be from the butter. When the paper was stripped it showed it was not very well packed. There were a good many air places, and these were filled with this mould. I bought a package of this butter and sent it to Mr. Lloyd, a well known chemist, and he sent me a brief report. He said it was a peculiar form of mould which was usually found on horse manure. The infection may have come from road dust getting into the cream, or it might be caused by the cream being handled in the barn yard where piles of horse manure are laying around. It is a very serious question that so much of our butter should turn out moulded. I learn that in this particular case some attempt had been made to pasteurize, but it was unsuccessful.

I hope to see still further improvement at Bristol, Glasgow and Liverpool. They will have at Bristol in a few months a new dock which will be one of the largest docks in the country, costing some $30,000,000. It will be equipped with cold storage facilities, and everything necessary for handling Canadian produce. They are making a special effort to capture the

Canadian trade. They think it is the best port in Great Britain for receiving Canadian butter and cheese. And at Glasgow there will be an improvement in that respect during the present season. They have a magnificent dock at Liverpool, everything for handling ordinary freight, but they have not the facilities for handling the products, butter and cheese, and they put it into warehouses and allow it to remain there several days at a time, and we have had a good deal of correspondence over this matter. I found the trade there to be feeling rather indignant. They seemed to think we were dictating to them how they should conduct their business, but after I had a meeting with the directors of the Liverpool Trade Association I succeeded in removing any feeling of antagonism on that point, and they feel that we have a right to make suggestions as how to improve facilities for receiving our goods. They said, "You could not point out a specific case where butter was actually damaged by reason of the way it was received," and I said, "If that is so, how is it you require butter to be shipped from Canada in cold storage? There is not a merchant among you that would receive a shipment of butter sent across the ocean in the ordinary temperature of the steamship, and it would not be as high as on the docks, and it would not be as long as you have kept it on the docks." They are now arranging to have better facilities. At London there are a great many docks, and there is great rivalry among them, but at Liverpool the docks are controlled by the Mersey Dock Co., and it is very difficult to move them.

Mr. McPhail: Can you tell me the reason they are buying butter paper with the words "Creamery Butter" printed on it and selling dairy as creamery butter?

Prof. Ruddick: The law defines what is dairy butter, and what is creamery. If a merchant buys dairy butter and works it over and puts it in fifty-six pound boxes and sells it for creamery butter, he can be fined for doing so, and I should be very glad to get information about anything of that kind.

BUTTERMAKING.

By J. A. McFeeters, Dairy School, Guelph.

I am sure we as dairymen are very much gratified at the report which the Dairy Commissioner has given us with regard to the condition of our butter in the old land. For a number of years we have been trying to improve the product, and we were told year after year that our butter was not making progress in the mother land. In some instances it was the last butter the dealer would take, and we are very pleased to have these encouraging words from Mr. Ruddick. We should not allow it to swell our upper stories too much, and so have us grow careless. We should ever bear in mind that we are aiming at a place in the market, and we can only hold that place by eternal vigilance.

This export butter trade is one of the most important points that we have to deal with. I have heard some local men say: "This export question does not cut much figure with me because I am sending my butter to Toronto and Montreal." But he forgets that it is the export market that determines, to a very large extent, the returns he will receive in the local market. When the export market is good there is a big demand in the home market, and the export market determines the rate at which the wheels of progress shall turn on trade lines. I think the address we have heard this afternoon has proven that we are making progress at the present time. A certain man who had achieved success in this line gave as the reason for his success that when a small boy he cultivated the habit of criticizing every character with whom he came in contact. For instance, if a man impressed him, he criticized him so carefully as to pick out just the qualities he thought were desirable, and he tried to cultivate these as much as possible, and the objectionable characteristics he would try and guard himself as far as possible against, and I think the same principle might be applied to the dairy business.

Mr. Ruddick has already pointed out some of the conditions which contributed towards the improvement we have made in the butter trade. As has been said, one of the reasons for this improvement is that the demand has been so great as to create a prompt shipment on the part of the creamery men, and I think that is an important point. We should ship our butter as soon as possible after it is made. And we have also improved in cold storage facilities and transportation.

We are told that one of the great defects in the quality of our butter is lack of uniformity. I had a consultation with a creamery man not very long ago in which he said he had a car of butter in his storage which was for sale and which was examined very critically by a butter dealer, and after going over it very carefully he said, "How many creameries have you?" and he said, "One;" and the dealer said, "I find here four distinct flavors." This was looked into very closely, and they found that in this creamy the milk was brought from four different routes, and the cream was churned by itself, each route separate, and that was the reason they had four distinct flavors. To avoid that they arranged to churn all the cream together, and in that way the flavor was made more uniform.

We who have experience in instruction and dairy school work find it very difficult to give special regulations or instructions that will apply to all cases. There is a lack of uniformity and color, and some say that is due to the desire to incorporate an abnormal amount of moisture.

We have also had difficulty arising from the mould. The absence of salt in butter seems to cause a disposition towards the growth of mould which is very hard to overcome. We are glad to have with us this afternoon Prof. Harrison from the Agricultural College, Guelph, who will be able to give us something from a scientific standpoint along this line. Prof. McKay made some references as to pasteurizing, and I regret that point was not taken up in discussion. Some creamery men attribute the improvement in our butter to pasteurizing of collected cream.

It does not pay to hold the butter for a rising market. We would be better off if we were to send the butter regularly at the end of one or two weeks, take the prevailing price at that time, and get the very best price we can when the butter is in prime condition. As a rule the difference in quality will offset the difference in price. There is a speculative feature in connection with the butter industry which is very hard to get legislation to cover.

I am very glad that our friend introduced this question of dairy butter. I know that in some sections it is said that dairy butter has been put up in fifty-six pound boxes and sold as creamery butter, and I feel that this is a very great injustice to the creamery trade. I thank you very much for your attention.

Prof. Harrison: I do not know that any speaker has given me any opportunity to say anything about bad flavors and bad odors. There was something said about mouldy butter, and I might say a word or two about that. We have had, in the last year or two, a number of papers sent to us to Guelph for examination, and the mould on them has been the common blue-green mould. I was much surprised to hear that a mould associated with horse manure was found on the butter. This mould is a black one, and I am surprised at Mr. Lloyd's statement, because if you make any experiments with these you will invariably get a black mould, and I am very much surprised to get it on butter.

These moulds are plants, and like plants they require air in order to grow. If you do not pack your butter properly they are more apt to grow, and if you leave a hollow space in your box you will leave room for their growth, and they will be supplied with oxygen. The tighter you pack the butter the better it will be. Another point is in regard to the material that the boxes are made of. You will find that moulds are able to grow through sappy woods, because the sap contains sugar and other substances which attract the moulds. The moulds in order to grow must have the oxygen in the air to breathe, they must have food to eat, and they must have moisture, and if we can reduce all these things you will do a great deal to prevent mould growing.

Then there is the question of keeping the mould down by immersing the paper in formalin or some antiseptic solution. Boracic acid is of no use. I have frequently had moulds actually grow in a two per cent. solution of boracic acid, and I have seen them grow in a two per cent. solution of copper sulphate or bluestone. Formalin is the best thing to prevent mould on the butter and when you are buying formalin get the proper article. (Applause.)

Mr. Keller: What percentage of formalin would you use in order to destroy mould?

Prof. Harrison: If you buy it with the strength of 40 per cent., 2 per cent. is quite sufficient, but if you are doubtful about the strength of your formalin then it is preferable to use at least 5 per cent., and I would leave the paper in over night.

Mr. Keller: Could you use the same solution a second time?

Prof. Harrison: Provided you kept it well covered. You can judge to a certain extent by the smell.

A Member: Will pasteurizing completely destroy the stable flavors?

Prof. Harrison: Not completely; but it will help to drive them off. Pasteurizing will destroy cow flavors. There are living organisms which will produce distinct cowy odors, and I can produce these odors by putting these organisms into sterilized milk that is absolutely free from any suspicion of smell. You may have cowy odors from the growth of certain organisms in milk, and the ordinary smell of cow manure is largely due to the same bacteria which we find in milk. There is also the cowy odor from milk which comes from absorbing stable odors. Pasteurizing will kill this bacteria. If the odor on the milk comes from the absorption of stable odors then you may to a certain extent drive it off, but I do not think you can kill it altogether.

A Lady Member: Has salt any action on formalin?

Prof. Harcourt: I think there would be no particular action.

Prof. Ruddick: I would like to draw one more lesson from my experience in Denmark. The Danish creamery maker makes a very liberal use of lime around his creamery. The inside of the churn and the butter worker and all wooden utensils and the floor are washed with lime, a then they are sweet and clean. I visited that great institution, the Copenhagen Milk Supply Company, the parent of all the city dairies in the world, and there every utensil and every milk can is put through a vat of strong lime water, and I think it is a good thing to use lime for keeping the utensils sweet and clean. I think that would help to keep away the mould. I never heard of any difficulty with mould in Danish butter, but they have that trouble with the Irish butter. I recommend this matter of lime washing to the consideration of the Canadian butter and cheese makers.

A LADY MEMBER: At what strength would you use it?

Prof. RUDDICK: Make it into a regular whitewash for the wooden utensils.

A MEMBER: Is it hard to wash off?

Prof. RUDDICK: No, I did not see any difficulty about that.

ADDRESS.

By G. C. CREELMAN, PRESIDENT O. A. C., GUELPH.

It is with the greatest possible delight that I appear before an Ingersoll audience to-night, because the Western Ontario Dairymen's Association, as it is now styled, had its birth here thirty-six years ago. A year after that, the Ontario Agricultural College and Experimental Farm had its birth in Guelph; and if you will excuse a personal allusion, I was born in that same year, and at once went into the dairy business. (Laughter.) This is one of the greatest meetings it has ever been my pleasure to attend under the auspices of the Western Dairymen's Association.

If I could take this table and pile it up with gold nuggets as high as it would hold, and if they should shine up into your eyes, and I should say, "That was all produced in this country," you would think the land that produced that sort of thing must be a desirable country to live in. Where does our gold come from? You think of the Yukon country, and you think of the few men who got rich up there, and when you think a little more you will remember that some of the boys are back on the old farm, and you will remember how glad they were to get back. They did not all strike it rich. Some lived to come back, but many left their bones up the trail, stretching all the way from Vancouver to the Yukon almost. If I should start down the room a great train of fat bullocks with their broad, sleek sides speaking of roast beef that is to come, and if you examined them with their well-sprung ribs, you would say to yourselves, "A country that can produce animals like that must be a great country to live in." Stop and think for a moment of the great Argentine Republic that produced so much beef for the great English-speaking world, and particularly for the Englishmen at home, and then think that they have their bad seasons, and they have all kinds of troubles. And when it comes to a matter of agriculture they have had to send thirty young men to the Ontario Agricultural College to learn agriculture, and go back to their own people and teach them how we do things in Ontario. (Applause.)

And the next thing to think about is a great flock of sheep. One of the most important industries in the world is that of wool and mutton. As the sheep pass before us with their broad backs and the splendid fleeces that you can open out and see the rich creamy color of their skin, you say "That is a great country that can produce sheep like that." Then you think of Australia, where the Englishmen and the Irishmen and the Scotchmen have gone and settled, and you think of the drouth that came, and how the sheep were driven upon the hills and the waters gave out there, and they were driven up on the top of the mountains and they died, and the men lost thousands upon thousands, and you say, "There are troubles in every country." If I could go down stairs and bring up and pile on top of this platform a beautiful cheese—the splendid cheese which cannot be made any better anywhere in the world, as the Englishman knows to his cost and to our gain—if I piled that cheese on this platform you would say, "Any country that can produce cheese like that must be the greatest country in the world." Then stop and think of Germany and Holland and Denmark and the great countries of the Old World, and if you think seriously you must admit we have got German people here. Why did they leave home? We have Hollanders and Dutch in this country. Why did they leave home? And then you come to the conclusion, as so many of us have come who have travelled over the world, and when we came back we have said, "Ontario is good enough for us." And so it is my pleasure to-night to say some things about the agriculture of Ontario —some things that it has been my privilege to see and observe, having had more opportunities than some of you of observing them while I have been travelling around the country in connection with my duties. We have at Guelph to-day 250 farmers, old men some of them, with their sons and grandsons, who are learning to judge these fat cattle and sheep and hogs and dairy cattle and horses. They go there to give their sons and grandsons a chance to pick up a few ideas in order that they may know better what to buy, and we have in this Ontario of ours many of these splendid animals, and we have more than that. We have a splendid fruit country, where we can grow apples and pears and peaches and grapes and small fruits in abundance. We can also grow wheat, rye, barley, hay, and all the vegetables that can be grown anywhere in the world, and we say again Ontario is good enough for us. What kind of a business is it that we are engaged in—this business of agriculture? Do you know how much money a thousand millions of dollars is? I do not think I can ever get close enough to a big bank to see that amount of money. A thousand million of dollars is a billion, and a billion dollars represents exactly what the farm buildings and farm stock and implements of the Province of Ontario are worth. That is the business you are engaged in, farmers. (Laughter.) If that is true then every man, every woman and child in this audience is engaged in the scientific study of agriculture. And when you find yourself engaged in a billion dollar business you should not begin to think you are only worth so much and your farm is only worth so much. There are other businesses in the world outside the business in which we are specially engaged, and I think our business is one in which we ought to take more personal pride than we do. The man engaged in the manufacturing business, or in any other business in the city, must have large capital if he wants to have large returns; and in the second place he must have long hours. Do you ever think of that when you go into the city and read a doctor's sign: "Hours from 10 to 12 and from 7 to 8." He does not know when he is going to be called out, and his business is never done; and the merchant is practically in the same condition. If he is not working at it he is worrying about it. They say they will retire as soon as they have enough ahead, but they never get that far. But as soon as they get enough ahead, they all say they are going to buy a farm and settle down upon it.

I hope to live to see the day when we will have things specialized the same as they are in England, where they have one county that raises one particular class of cattle, and I hope to live to see the day when one particular county or section of this country will be recognized as the county for breeding a particular kind of sheep, and another county for Shorthorn cattle, and another for dairy cattle, and so on: so that when a buyer comes into that part of the country he will be able to get a car load or a ship load without having to travel all over the country to get them. At the present day when a man wants to get a car load of Shorthorn cattle he will go to Guelph and get half a load, and then he will go to South Ontario and get a few more, and then he goes to near Hamilton and gets a few more, and we have to pay for his travelling and for the extra cost of shipping in the reduced price that we receive for our cattle. So far as I can see, the keener the competition the more money there is in it for us.

We have representatives of some other professions here on the platform to-night. I would not minimize them. They are just as important, and just as necessary in the community, as any other line of business. When I was in the Parliament Buildings, Toronto, a young man came to me who was engaged in the practice of law. He said, "George, how are you?" and I said, "First rate, how are you?" He said, "I am not getting on well in business. Do you remember we went to school together?" I said, "Yes." He said, "I went to the Public school before I entered the High school, and I then stayed four years there." I said, "Yes, you were head of your class." He said, "Yes; and I went afterwards to the University and graduated, and then I went to the Law School, and I have spent sixteen years preparing myself for my life work, and now I find the competition so keen, and I have not got very much push about me, and I have been waiting for business to come to me, and I know that when a case is brought to me I do the best I can. I have a wife and two children, and I find the competition so keen that I want to know if you can get me a place anywhere about here, because I am willing to give up my position and take a municipal or legislative clerkship at the salary of six hundred to one thousand dollars a year.

Another friend of mine from the town of Cobourg passed through a similar experience. He went to Trinity University, made a specialty of mathematics, and he had to spend a year in Hamilton at the school there, and then he corresponded with the different High schools, and he had strong testimonials. It went on to November, and he had no chance to do anything. He was about twenty-six years of age, and he finally wound up that year in taking a position as teacher in a common school up in the Parry Sound District at a salary of thirty-five dollars a month. That man has spent to my own personal knowledge, he and his mother (who needed the money, but who had pride in her son), at least $2,000 on his education, and the competition was so keen in this line of business that he had to take less than we pay our ordinary hired man, and he had to pay his board out of his wages. I might also mention the profession of medicine. It is said when the second contingent was called out to go to South Africa six hundred young doctors in the Province of Ontario offered their services to go out there and bleed and die for their country, and there were enough left at home to look after us. You farmers know that young men who have left your own village and gone to college, and probably spent a year or two in the Old Country in the hospitals there, or in our own hospitals, and who have come back and settled in your own midst, and there are now six or seven or eight doctors in your little town, whereas in the olden days you would only have but one on each side of politics. (Laughter.)

In agriculture we have a different condition of things. It was my privilege to be raised on an ordinary farm, and I went to the Ontario Agricultural College. In those days we always had enough to eat, although we had a small farm and a large family, but if a man from town drove past our place without stopping for a meal, or if some of the boys did not bring somebody home for a meal, they thought the neighbors were forgetting us, or the boys were not popular in the community. But when I lived in the city of Toronto, although I received a comfortable salary, I felt that if I would bring three or four people home to dinner it would be up to me to make some arrangements whereby my wife might be prepared to send out to buy something so that there would be enough to go round. (Laughter.) That is no joke. I do not think my children ever got a pint of milk in one day in the city of Toronto; they never got a quart, because milk is seven cents a quart. And when you think of the children of a man who had a Government job not being able to get all the milk they wanted, what do you suppose would happen to the thousands and one who are not getting a good salary? On the farm you have plenty of meat, plenty of fruit, plenty of eggs every day in the year, plenty of these things that keep people in that condition that they do not require to ask questions whether they are going to have one or two extra in to dinner. The difference between town and country people is that they do not exactly understand one another, and that the country people imagine that the town man is stuck up, and the town man thinks the country man will not spend a quarter or a half a dollar, and as for spending a dollar, why, they never heard of such a thing. I have noticed that in the community where I was raised that if a man came around and asked my father or any other man for a subscription of fifteen or twenty dollars for the church he would laugh and say, "I have not got the money. Why don't you go into town, where they are rolling in money?" But when they were going to have a church social, and trying to raise enough to pay off the debt, father would say, "I can send you over a sack of flour or a side of meat; or my wife will make up a batch of bread or make sandwiches, and we will make up a waggon load; we have more than we need and you can have it." But if you sent a waggon around to the household of a man in town for a load of provisions you would clean his whole house out. Whatever money he has is in his pocket, and if you come for a church subscription he will give you five dollars and you think he is rolling in wealth. One man handles money and the other handles goods, and when you are calling the farmer mean you had better be careful, because it is from the farm that have come the best men in medicine, in law, and in politics in this Dominion.

Marked improvements have been brought about in agriculture in this Province of ours in the last thirty years. The people of this country are a splendid intermingling of the Irish, Scotch and English, and some Germans, men who have come out from the Old Country in the early days, men who have come out here to find a home for themselves, and who hewed out from the forest a home for themselves and the future generations. I have not heard the report to-night as to whether Marshall Field, the great millionaire merchant of the city of Chicago, is dead or not, but I think of a remark he made to me one evening in Chicago when it was my privilege to sit next to him on the platform. He said, "I have hundreds of Canadian boys in my store down town, and I see in them three things that stand out prominently in comparison with boys that we get from other countries. Your boys come here raw from the Ontario farm; they are industrious. They are not looking at the clock, but they seem to think they have struck a soft job over here, and that they do not think they have anything to do but work with me for ten hours a day. They are good moral boys and temperate boys. They do not come back in the morning with big bulging eyes, with their fingers covered with yellow stains of cigarettes; they come back ready for work and they are there on time. I find them highly intelligent. I start them to work, and give them an idea of what I want done, and they seem to take great interest in the work. The hardest job I have with your Canadian boys is to keep them from asking for partnerships." And so we are proud of the boys from the Ontario farms.

I do not like to pass the girls without saying a word to them. I saw in the paper the other day that the heads of several of the large hospitals in the United States are Canadian nurses, and that all the way down the line they are leading and are taking the place of American girls in the great hospitals because of their intelligence, industry, and morality: and the same qualities are being displayed by the boys and girls who remain at home and they are standing for what is right and good.

The Ontario Agricultural College has done something to help along this general uplift of Ontario agriculture. Some of the boys of that College come from the States, some from the old countries, but the great bulk come from the Ontario farms. We are turning them out as best we can to the different occupations of life. The greater percentage of them go away to work out their own salvation on the farms, and others of them go out into other fields of usefulness. Three or four of them are sitting right here before me. representing the great agricultural press of the Province of Ontario. That is one part of our work. Another part of our work is looking after the other ninety-and-nine, because we can only look after one per cent. at the College. An institution that does not reach out any further than its own environments is not doing the greatest good, and hence we invite our friends to come to the College. I see some gentlemen and ladies here whom I have seen before, who came there in June when we had been thirty-five and forty thousand to come and go over the farm and through the stables and dairy, and ask questions and criticize and take home suggestions. We have received some of the most valuable suggestions in that way as to the management of the place, and we hope to do better next year and improve our conditions generally. We are trying to do the best we can from year to year; we are trying to get everything on a more paying basis. I do not think it is the function of the College to pay. We are trying to give the pupils a maximum amount of instruction and information at the least possible cost. We are doing it in the best way we can, and we have yet a lot to learn. Our bulletin reports go to those who visited the Farm and attended the Farmers' Institute meetings, and they can read these bulletins over in their own homes. These bulletins are the result of experiments conducted at the Experimental Farm. Some of them do not amount to very much, but if you keep up to them you will get information that will be useful to you. There is one point I must not fail to mention and that is our co-operative work in connection with grasses, grains, plants, and roots under the direction of Prof. Zavitz.

What are we going to do about it? Have we got to the end? Is the Province of Ontario doing all for its farmers that it ought to do? Are the farmers themselves doing all they ought to do for themselves and their families? I am not here to dictate to you. We have a splendid Department of Education and a splendid Department of Agriculture, and the Department of Agriculture is presided over by a practical farmer, a man who knows his business, and who has been called from the farm to the highest position in agriculture in the Province of Ontario, and who is able to preside over it with dignity and credit.

I think our common schools are not doing the work they should do. Why should the boy who is going to be a farmer, or a girl who is going to live on a farm, be kept in a country school learning everything else except those things which are going to be useful to her when she comes into her life work or his life work? (Applause.) I feel the time must come when the farmers of the Province of Ontario are entitled to just as good instruction for their girls and boys as the town and city people are getting for their children.

What are you going to do about it? We have in a small way endeavored through the munificence of Sir William Macdonald to get the farmers of six school sections to consolidate. Some of them had twenty in a school, some thirty and some forty; a one-roomed school, teaching from the A B C's right up; and we thought if we could get these schools together and have just one school where we could have five or six teachers, and where the boys could take up a little manual training and the girls take up cooking and laundry work and sew; where they could learn these things that are going to be useful to them every day, it would be a good thing. We started in this way, and it has been going on for a year, and it has been working most satisfactorily. I can hardly keep my own children home on Saturday, and frequently they go to school Saturday morning to finish up something that was left over, and if their mother says to them, "You must stay at home this morning, you are tired," there is a crying match right off. They are interested in their work at school, and they are getting instruction that is helping them.

What is going to be the future of it? I am just afraid that public opinion in country places is not educated up to the point where they are going to be willing to pay enough to keep that thing going after Sir William Macdonald withdraws his support of it. Now it is an experiment, and Sir William is willing to pay for the experiment until the people can see by the advancement their children are making that it is a good thing. I hope they will do just as they have been doing over where my friend Prof. McKay comes from, where they have this consolidated school nearly everywhere, and where the children can go dry-shod in a waggon. Last year twenty-three of our little children under seven years of age never missed a day during that very severe winter.

Another thing we have got to get is the agricultural high school. Nothing pleases me more than to hear Mr. Whitney say that all the farmers' sons of this Province cannot go to the Agricultural College, but that the Government can provide something in the way of agricultural instruction near their homes, and I believe the people will rise up and call him blessed if he carries that out and give us agricultural high schools with properly trained teachers.

WINTER DAIRY EXHIBITION, PRIZE LIST.

September White Cheese:	Total Score.
1st.—Jas. Paton, Newry	96.50
2nd.—Jno. Cuthbertson, Sebringville	96.08
3rd.—Alex. F. Clark, Poole	95.41
4th.—Mary Morrison, Newry	95.33
September Colored Cheese:	
1st.—Geo. Cameron, Hagersville	95.33
2nd.—Jas. Thompson, Smithville	94.75
3rd.—J. S. Isard, Paisley	94.68
4th.—J. H. Williams, Embro	94.58
October White Cheese:	
1st.—Jno. Cuthbertson, Sebringville	96.
2nd.—W. Hamilton, Listowel	95.50
3rd.—D. Menzies, Canboro	95.41
4th.—W. A. Bothwell, Hickson	95.33
October Colored Cheese:	
1st.—Alex. McCallum, Kintore	95.08
2nd.—Tie for second, A. E. Gracey, Dorchester, and J. H. Williams, Embro	94.58
3rd.—	
4th.—D. Menzies, Canboro	94.42

Special by the Ballantyne Dairy Supply Co.—Two Handsome Gold Watches.

For cheese scoring highest number of points made with Royal Danish Extract:

Class 1.— Sec. 1, Jno. Cuthbertson, Sebringville ...(Sept. White)
Class 1.—Sec. 2, J. S. Isard, Paisley ....(Sept. Colored)

Special by C. H. Slawson & Co.

For cheese scoring highest number of points made with Hansen's Rennet Extract in October, white or colored. $25.00 in cash:
Jno. Cuthbertson, Sebringville.

Special by Ryrie Bros.—Bronze Medal.

Best finished and most stylish-looking cheese. Jas. Paton.

ADDRESS.

By Col. J. C. Hegler, Ingersoll.

When Dr. Coleridge gave a description of the curing-rooms last night I thought how different it was in the days when I was a young cheesemaker. We used at times to make a very peculiar kind of cheese that we called "floaters." As you went through the curing-room you could see on the shelves cheese with great big wings on, and sometimes these cheese would explode, and it was my duty to go around every morning and make holes in these bubbles. But one morning I forgot to do it, and one of the cheese burst. Do you think we wasted that cheese? Not by any means! We simply cut it up and sold it to the patrons. Upon another occasion some of the cheese would not sit upright, and one of them fell off the shelf and through the side of the curing-room, and I give you my word of honor that it actually killed three pigs. We saved the cheese however, and cut it up and sold it to the patrons. We had our pigs under our curing-room. It did not smell very nice, but the pigs got along all right, but the people who ate the cheese are all dead.

I left the cheese factory and came to Ingersoll, and soon after that the Dairymen's Association was formed. I hold in my hand a copy of the reports of nine of the earliest meetings of the Dairymen's Association. The first meeting was held in this very hall in February, 1867. In looking over the records of the meeting one of the sad things which we must remember is that I could find no record of any person who is now living who was at the meeting with the exception of four: Mr. James Noxon, Hon. Thos. Ballantyne, Mr. Geo. Galloway, and myself. Every one of the members of the Association, so far as I know, are dead with the exception of these four I have mentioned.

Mr. Creelman has told you of the benefit that the farmers have derived from the Ontario Agricultural College, Guelph, of which we are all very proud. Thirty-five years ago a resolution was passed in this town of Ingersoll at a meeting by which we laid the foundation stones of that great College.

"Moved by Mr. C. E. Chadwick," a gentleman whose name is held in reverence by the people of this town, and "seconded by Thos. Ballantyne, and resolved as follows, That in view of the establishment of a model farm by the Legislature of Ontario, the president and secretary be empowered to memorialize the Government of Ontario relating to the establishment of same." So that I contend that to the dairymen and their Association in this town, in this very hall, was properly due one of the reasons for the establishment of that great institution in Guelph.

I know of but one other copy of this volume that I have in my hand. It is a bound copy of the reports of the proceedings of the Association for the years 1866-74. The late Mr. Chadwick and I took it into our heads to keep copies of the reports of these meetings and have them bound. With the permission of the chairman, I have taken the liberty of presenting this volume to the Dairymen's Association of Western Ontario in order that they may take care of it, and in order that they may have one of the earliest records of themselves, which I think one of the most important organizations of agricultural character in this Province. (Applause.)

I do not think there is a gentlemen present who was an officer of the Association at the time I first became the secretary in 1873. When the two Associations were combined, I became secretary, appointed by Act of Parliament and acted until the two Associations separated, and became the Dairymen's Association of Eastern Ontario and the Dairymen's Association of Western Ontario. Then I became treasurer of this Association, and I have continuously been an officer and member of the Association until the present day. I hope the young cheese-makers present will take some lessons for the good home with them, and that they will be influenced in some way for good by the personal experiences I have given them of my history as a cheese-maker.

ADDRESS.

By M. S. Schell, M.P., Woodstock.

I am sure it affords a great deal of pleasure to meet with you in this Convention. No one can look into the faces of this intelligent audience without being inspired with the thought and the idea that you were interested in the business of dairying. You would not be gathered as we see you this evening without being impressed with the thought that you are interested in this work of dairying. It is the best testimony that can be paid to the people who are engaged in this business, that we see you coming out in such large numbers, and coming out not merely that you may be entertained, but that you may get information to better yourselves to go on in the work in which you are engaged.

When we consider what has been accomplished by the Dairymen's Association of Western Ontario, I might venture to say that you have done as great a work as any similar Association in the world. I think the Dairymen's Association deserves the credit for the organization of the Farmer's Institutes throughout this Province. I think they sent out the first delegation to hold meetings in connection with the industry. Some ten years ago a dozen meetings were held under their auspices before Farmers' Institutes were thought of.

Ingersoll now occupies the proud position of being the centre of the dairy industry of the Province. Within a radius of twelve miles of the town of Ingersoll there are more cheese made than is produced in any similar district in this Province of Ontario, and I am confident that there is no area in this rich and prosperous Province where the farms are in such a high state of cultivation, where the barns are more commodious, the equipment better, the houses larger and better furnished, or where the people enjoy more of the good things of this life than they do in this part of the community; and I think this is owing, very largely, to the fact that you have gone into the dairy business with a view of making a success of it.

There is no class of people in this Dominion who are more prosperous or enterprising than those farmers who have undertaken this line of work.

We should try to get new inspiration, and set up higher standards and higher ideas. Put into practice those thoughts and ideas that we have gathered in this Convention, and go forth inspired with the determination that we will put into our work our very best efforts. A man may have any amount of technical knowledge, but if he does not go at it with determination he will never reach success. It is just in propostion as we put our life into our work that we will make success in that line of work. And so I hope the young men, of whom I see many present this evening, will go forth determined to make the best possible use of the information that they are gathering in this Convention, and that they will not be satisfied simply with coming here and listening to a few speeches and then go home and forget all about it. But I hope you will go home and ponder over and study what you heard here until it becomes part of your nature, and if you think you can improve in anything you have heard put it into practice. Make it part of your own being, as it were, what you learned at this Convention. One young man said here to-night that he hoped to win the trophy next year. I believe every young man should look beyond where he is standing at the present time, and he should make up his mind that he is going to be the best cheese-maker in Western Ontario. Even although we have good cheese to-day we will have better cheese next year, if you go at it with determination. We are making rapid progress in this industry, and no man can look at the work that is being done by this Association without being impressed with the fact that the educational work that you are doing is the reason for the rapid progress that we are making.

We are exporting to the United Kingdom cheese to the value of over $24,000,000 a year. 1903 was the banner year in connection with this industry, both as to quantity and as to price. The total export that year amounted to $24,700,000, or three times the amount of ten years before. I am glad to tell you the year 1905 has placed us again on top, and we are to-day rejoicing over a great year of great prosperity. The price is back almost to the level of 1903, and the return this year in money value to the farmer will be about $24,000,000.

Our exports of butter this year amount to 575,449 packages. That was 83,000 packages more than we exported last year, and 235,000 more than we exported two years ago, and the average price attained was 21½ cents per pound, representing the money value of nearly $8,000,000, and an increase over last year of nearly $250,000. The butter we are making to-day is very much better than we have ever made before. A few years ago Canadian butter did not bring within 6 cents a pound on the English market of the price of Danish, and to-day there is only a difference of 2 cents a pound. I have faith in the business; not merely a theoretical faith but a practical faith. I know that there are many herds of cows producing 5,800 pounds on the average. If our cows are fed and bred and handled in the best possible way, I see no reason why we do not reach the average of 6,000 pounds per cow. Let us set our standard a little higher and direct our efforts with the single purpose of making our business profitable.

A young man told me the other day that he had seven or eight cows in his herd that give on an average of over 6,000 pounds of milk since last September. You say that is something you can hardly believe, and of course you could not if it were not for the fact that this man is building up one of the best herds in the Dominion of Canada, and has been a winner for many years at one of our shows. Another man told me that his herd averaged about 8,000 pounds of milk; he is producing milk to sell and he keeps grade cows. I know the men who have these herds, and who are attaining these results. Is there danger of over-production? No, I do not think there is the slightest need of fear in that respect. I believe that with the united efforts of the cheese-makers and cheese buyers and of milk producers, increased production and improvement in the quality, there is no reason why success should not crown our efforts. If we will go home determined to put into practice that which we know and believe to be the best. Let us put our best efforts into this work, and we will continue to make the progress that we should.

REMARKS ON CHEESE JUDGING.

Mr. JOHN MUIR: The only comments I have to make is that I would like to compliment the makers who exhibit the cheese here for the stylish manner in which the cheese were finished. They really were a credit. The quality of the cheese were not quite so good as they might have been, but the finish was perfect.

Mr. GEORGE BARR: I have no report to make on the cheese contest. The cheese were judged by the three judges who judged the cheese at the exhibition down stairs, and the average score of these three judges will be taken as the test for awarding the prize. I scarcely know how much work we have to do in connection with getting at the result, and I do not know whether we will have that result to-day or not. Each particularly card has to be compared with the judge's score. I think it is going to be a tremendous job, but we will work it out in some way, and we will have it published in the papers, so that you will be able to see it. We may have some ties, and there is only one way of settling that, and that is we will divide money between those who are tied.

We have had the best dairy exhibit that was ever made in Canada or any place else in the world in the winter time. I do not believe any place else can turn out nicer finished cheese than we had at this convention. I do not know anything about the quality, but I want to say that our makers have certainly put up the nicest finished cheese and the most stylish cheese that could possibly be put up in the world, and I feel proud of them. Don't get discouraged. You see how the prizes are awarded. We have only one or two in the prize list this year that were in last year. It is as liable to go one place as another. We have had 171 entries in cheese this year and 67 in butter. (Applause.)

A MEMBER: Was any cheese from Eastern Ontario exhibited here?

Mr. BARR: No; but we would welcome it.

ELECTION OF OFFICERS.

Mr. MILLAR presented the report of the Nominating Committee, and said: In departing from the ordinary proceedure in selecting these men, we have done so in belief that it was in the interest of this Association and the dairymen of this western part of Ontario.

The report was adopted, and the officers as named on page 6 were declared elected.

RESOLUTIONS.

We, your Committee on Resolutions, beg to submit the following:

(1) That the members of this Association desire to express their gratitude to the Mayor and Council, the members of the Board of Trade, and the citizens of the town of Ingersoll for the hearty welcome and generous treatment granted them while in the town, and for the use of the building for holding our convention. Carried.

(2) That the Western Dairymen's Association desires to express its appreciation of the way the press of Ingersoll has assisted towards the success of our convention, and to the press throughout the Province for the interest always shown in the dairy business by the publication of much information helping to place dairying in its present high position. Carried.

(3) That the question of co-operating with the Eastern Dairymen's Association in making an appeal to the Ontario Government for some system of sanitary inspection to apply to cheese factories and creameries in Ontario be referred to the Board of Directors for 1906 with power to act. Carried.

(4) Moved by Mr. PETER DUNN, seconded by Mr. W. PATERSON, and resolved: That this convention thoroughly approves of the plan of forming Cow Testing Associations, and heartily recommends the adoption of this system to factory owners and farmers as an effective means of ascertaining the productiveness of individual cows, thereby making the business of dairy farming more profitable.

(5) Moved by Mr. MCLEOD, seconded by Mr. PARSONS, Jarvis, and resolved: That whereas the ever increasing keen competition in the world's markets for dairy produce has enforced upon us the great need there is for the most scientific instruction to our cheese and butter-makers, and that our Dairy School at Guelph should be thoroughly equipped with the very latest improved apparatus to properly fit out our makers for the battle for supremacy in these markets, and while recognizing the fact that the present accommodation and equipment at Guelph were sufficient for past requirements, we believe we have arrived at the time for a forward movement and therefor whould respectfully recommend to the Honorable Minister of Agriculture and the Government of our Province that a new dairy building be immediately erected, and fitted up in a manner consistent with the dairy requirements of the present, and at least equal to similar institutions on this continent.

In speaking to the last resolution, Mr. McLeod said: I think all will agree with me when I say that the accommodation at Guelph is not equal to the requirements of the present time. I think we ought to have a building there large enough to accommodate every person who would like to go and avail themselves of the educational opportunities, and I think they ought to have proper facilities for scientific investigation. Of course this costs money, and while I think it proper that every one of the men who are in charge of these departments should exercise the greatest economy in their departments, yet I think the purpose for which they are there is to carry on work ahead of the workers out in the factories. They should always be ahead of us and finding out the way they can best handle the milk and how we can improve on our present methods. I think that in submitting this resolution, I will have the hearty support of every person interested in dairying.

The Convention was then adjourned.

APPENDIX.

AN ACT TO PREVENT FRAUD IN THE MANUFACTURE OF CHEESE AND BUTTER.

R. S. O., 1897, Chap. 251.

Standard of Milk in Creameries.

1. All milk containing less than thirteen per cent. of total solids, of which three and three-quarters per cent. must be chemically dry butter-fat, shall be deemed below the standard required in creameries for butter manufacture.

2. The owners or board of management of any creamery in the Province of Ontario, may make such rules and regulations as may be advisable for the due carrying on of the business of the creamery.

3. The patrons of all creameries may be required to subscribe their names to such rules and regulations, and the rules and regulations shall be binding on the patrons, owners and board of management who have so subscribed.

Prevention of Frauds.

4. It shall be lawful for the owner or manager of a cheese or butter manufactory to require the owner or custodian of any cow or cows whose milk is being bought for, or supplied or sent to, the manufactory, to submit such cows at his farm or other premises where such cows are usually kept, to such milk test, by persons named by such owner or manager, as may be necessary for the said persons to ascertain the quantity and quality of the milk of such cow or cows, on any day, and at such time on any such day as may be appointed by said owner or manager, and in case the owner or custodian of the cows refuses to so submit them, or obstructs in the execution thereof the persons engaged in making the milk test, or interrupts the test, or interferes in any way with the test, or the application of its result, he shall on complaint before any Justice or Justices of the Peace, forfeit and pay for every such offence a sum of not less than $10 nor more than $100, in the discretion of the Justice or Justices of the Peace who may hear such complaint, together with the costs of the prosecution, if so ordered, and in default of payment of the penalty and costs, shall be liable to be committed by the convicting Justice or Justices of the Peace, to the common gaol of the county, with hard labor for any period not exceeding six months, or until said penalty and the costs of enforcing same are sooner paid.

5. It shall be lawful for the owner or manager of any cheese or butter manufactory who suspects any person of selling, supplying, sending or bringing milk to the manufactory, of any offence under this Act, to enter upon or to appoint some person or persons to enter upon, and such appointed person may enter upon the premises of the suspected person, with or without notice, and take samples of milk from the cow or cows from which the supposed offender was or had been immediately before then procuring the milk or part of the milk so sold, supplied, sent or brought as aforesaid; and any such suspected person who obstructs or refuses to permit the taking of any such sample shall, on conviction thereof, be liable to a penalty of not less than $10 nor more than $50 with costs of the prosecution, and in default of payment thereof, shall be liable to be imprisoned in the common gaol of the county in which the offence has been committed for a period not exceeding three months with hard labor.

6. No person shall sell, supply, bring or send to a cheese or butter manufactory, or the owner or manager thereof, to be manufactured, milk diluted with water, or in any way adulterated, or milk from which any cream has been taken, or milk commonly known as "skimmed milk," without distinctly notifying in writing, the owner or manager of such cheese or butter manufactory, that the milk so sold, supplied or brought to be manufactured has been so diluted with water or adulterated, or had the cream so taken from it, or become milk commonly known as "skimmed milk," as the case may be.

7. No person who, in the course of his business agrees to sell, supply, bring or send to any cheese or butter manufactory, or the owner or manager thereof, to be manufactured, the milk of any cow or cows, shall in the course of such dealing and business,

keep back any part of the milk of such cow or cows without distinctly notifying, in writing, the owner or manager of such cheese or butter manufactory what portion of the milk he has so kept back.

8. No person shall sell, supply, bring or send to a cheese or butter manufactory, or owner or manager thereof, to be manufactured, any milk that is tainted or partly sour, without distinctly notifying, in writing, the owner or manager of such cheese or butter manufactory of such milk being tainted or partly sour.

9.—(1) Any person who, by himself, or by his servant or agent, violates any of the provisions of sections 6, 7 or 8 of this Act, upon conviction thereof before any Justice or Justices of the Peace, shall forfeit and pay a sum of not less than $5 nor more than $50, together with the costs of prosecution, in the discretion of the Justice or Justices, and in default of payment of such penalty and costs, shall be liable to be committed to the common gaol of the county, with hard labor, for any period not exceeding six months, unless the said penalty and the costs of enforcing same are sooner paid.

(2) For the purpose of establishing the guilt of any such person under the said sections 6, 7 or 8 of this Act, it shall be sufficient *prima facie* evidence to show that such person, by himself, his servant, or agent, sold, supplied, sent or brought, to be manufactured, to any cheese or butter manufactory, milk substantially below the standard of that actually drawn, or by the accused represented as having been drawn from the same cow or cows within the then previous or subsequent week, provided the comparison or test is made by means of a lactometer and cream gauge, or by some other adequate means of making the comparison.

(3) The said sections 6, 7 and 8 shall not apply where the person charged with the offence proves to the satisfaction of the Justice or Justices of the Peace that the commission of the alleged offence was without his knowledge or privity, and contrary to hs wish and intention; and that he was not aware thereof.

(4) In any complaint made or laid under said sections 6, 7 or 8 of this Act, and in any conviction thereon, the milk complained of may be described as deteriorated milk, without specification of the cause or mode of deterioration, and such description shall be a sufficient description of the offence to sustain a conviction, and in any complaint, information or conviction under this Act the matter complained of may be declared, and shall be held to have arisen within the meaning of *The Ontario Summary Convictions Act*, at the place where the milk complained of was to be manufactured, notwithstanding that the deterioration thereof was effected elsewhere.

10. Any pecuniary penalty under the preceding section shall, when recovered, be payable one-half to the informant or complainant, and the other one-half to the owner, treasurer or president of the manufactory to which the milk was sent, sold or supplied for any of the purposes aforesaid in violation of any of the provisions of this Act, to be distributed among the patrons thereof in proportion to their respective interests in and profits thereof.

11.—(1) Any butter or cheese manufacturer who knowingly and fraudulently uses, or directs any of his employees to use for his or their individual benefit, any cream from the milk brought to any cheese or butter manufactory, without the consent of all the owners thereof, shall, for every offence, forfeit and pay a sum not less than $1 nor more than $50, in the discretion of the Justices before whom the case is heard.

(2) Any two or more Justices of the Peace, having jurisdiction within the locality where the offence has been committed, may hear and determine such complaint upon the oath of one or more credible witnesses, and shall have power, in case the penalty and costs awarded by them are not forthwith paid upon conviction, to levy the same by distress and sale of the goods and chattels of the offender, by warrant under their hands and seals or the hands and seals of any two of them, and the penalty, when recovered, shall be paid over by such Justices, one-half to the person complaining, and one-half to the treasurer of the municipality, district or place where the offence has been committed; and in default of payment or sufficient distress, the offender may, by warrant signed and sealed as aforesaid, be imprisoned in the common gaol for a period not less than one day nor more than twenty-five days, at the discretion of such Justices, or any two of them, unless such penalty, costs and the charges of commitment are sooner paid.

(3) Any party aggrieved by such fraudulent conduct as aforesaid may at his election sue the offender in any Civil Court of competent jurisdiction, and recover from him the amount of damages sustained, and levy the same with the costs according to the ordinary practice of the Court in which such action is brought.

12. No Justice or Justices having any pecuniary interest in a cheese or butter manufactory as aforesaid, shall hear or determine any complaint under this Act.

AN ACT TO AMEND THE ACT TO PREVENT FRAUD IN THE MANUFACTURE OF CHEESE AND BUTTER.

Assented to May 14th, 1906.

His Majesty, by and with the advice and consent of the Legislative Assembly of the Province of Ontario, enacts as follows:

1. Section 8 of Chapter 251 of the Revised Statutes of Ontario, 1897, is amended by adding the following clause:

(*a*) No person supplying milk or cream to a cheese factory or creamery, shall keep his dairy, milk house, milk stand, or any vessels or equipment used for the storing or the carrying of milk or cream, in an unclean or unsanitary condition.

2. Every cheese factory and creamery manufacturing butter or cheese for public use or sale, and the surroundings of every such cheese factory and creamery shall be kept in a clean and sanitary condition, and all the water used therein for the manufacture of any dairy products must be clean and pure.

3. The owner or manager of any cheese factory or creamery refusing or neglecting to observe the provisions of the previous section after being warned or advised by a dairy inspector, shall, upon conviction thereof before any Justice or Justices of the Peace, forfeit and pay a sum of not less than $50 nor more than $200, together with the costs of prosecution, and in default of payment of such penalty and costs shall be liable to be committed to the common gaol of the county with hard labor for a period not exceeding six months.

4. Upon the recommendation of the Minister of Agriculture, the Lieutenant-Governor in Council may appoint one or more persons as inspectors for the enforcing of the provisions of this Act, who shall be known as Dairy Inspectors. The Lieutenant-Governor in Council may determine the remuneration to be paid to such inspectors.

5. All dairy inspectors appointed under this Act shall have free access and admission to all cheese factories and creameries located within the Province and to all the lands adjoining the same, and to the premises of all persons supplying milk or cream to any cheese factory or creamery, and any person refusing admission to the same or offering obstruction to the work of inspection shall be subject to the penalties provided in section 9 of *The Act to prevent Fraud in the Manufacture of Cheese and Butter.*

6. Every inspector appointed under this Act shall make such reports and in such form as the Minister may direct.

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